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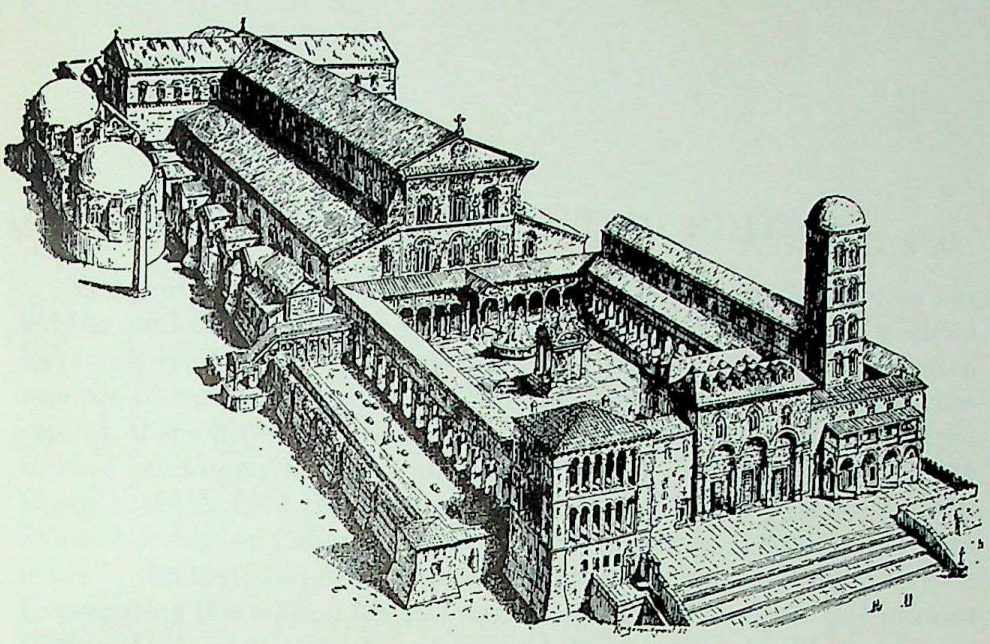

A SHORT HISTORY OF CIVILIZATION

HENRY S. LUCAS
Professor of European History
University of Washington

SECOND EDITION

NEW YORK · TORONTO · LONDON
McGRAW-HILL BOOK COMPANY, INC.
1953

A SHORT HISTORY OF CIVILIZATION

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Library of Congress Catalog Card Number: 53-6045

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THE MAPLE PRESS COMPANY, YORK, PA.

PREFACE TO THE SECOND EDITION

The generous reception accorded *A Short History of Civilization* has led the publishers to suggest this revision. In carrying out their wishes I have adhered to the original conception of the book—to treat a limited number of cultures which would introduce the reader to a tenable conception of the history of civilization. Those using this volume are urged to read extensively in important literature such as Plato's *Republic*, the Gospels, the Acts of the Apostles, Bede's *Ecclesiastical History*, Dante's *Divine Comedy*, or Calvin's *Institutes*. Numerous corrections have been made in the text, and certain passages have been fundamentally revised. In preparing this edition for the press special thanks are due to Professor Clifford Laity of the Montana School of Mines at Butte, Montana.

HENRY S. LUCAS

SEATTLE, WASH.
April, 1953

PREFACE TO THE FIRST EDITION

This volume, with certain modifications, contains the substance of an elementary course in the history of civilization given at the University of Washington from 1937 to 1940. The point of view throughout is that of the historian of culture. Political, social, and economic phenomena have been properly subordinated to general cultural development.

The author is deeply indebted to many friends among his colleagues at the University of Washington for suggestions, corrections, and stimulating criticism. In anthropology—surely one of the most suggestive of the newer social studies—thanks are due to Professors Verne Ray and Melville Jacobs. In history, Professor Solomon Katz has kindly advised in connection with the ancient periods, as Professor Frederic Schultheis has done with the chapters relating to the Orient. Dr. Helen Jenkins has been most helpful in offering advice, especially on the medieval and early modern periods. Professor W. Stull Holt has read the sections relating to America, and Professor Ivar Spector has criticized the passages on the U.S.S.R. The paragraphs concerning Indo-European philology have had the attention of Professor Herman Meyer. The following have extended help whenever asked for it: in geology, Professor George Goodspeed; in chemistry, Professor George Cady; in physics, Professors Joseph Henderson and Donald Loughridge; in astronomy, Professor Theodor Jacobsen; in the fine arts, Professor Lionel H. Pries. Finally, special thanks must be given to Paul W. Copeland, who read the manuscript and offered much help in improving the presentation.

To the publishers named in the legends accompanying the illustrations or in the footnotes special thanks are due for permission to quote from their books. For illustrative material the author is under obligation to the persons and authorities cited, and especially to A. Philip McMahon, Professor of Fine Arts at New York University, for the loan of certain photographs used in illustrating his *Art of Enjoying Art.* Special recognition is due the Cambridge University Press for permission to use features of a map in the *Cambridge Ancient History* in preparing Map I. The Yale University Press kindly permitted the use of a map in G. Vernadsky's *History of Russia,* which in modified form appears as Map VII. Other publishers, notably Ginn and Company, Henry Holt and Company, The Macmillan Company, the Oxford University Press, and Martinus Nijhoff of The Hague, have extended like favors.

Finally, particular thanks are due to Professor John M. Cooper of the Catholic University of America for reading the first three chapters; to Albert C. Schweizer, Professor of Architecture at New York University, for many suggestions touching nearly every chapter; to Professor Thomas D. Hanley of St. Martin's College for help in recent sociological matters; and to Professor Herbert E. Cory of the University of Washington for advice on philosophical topics.

In a book of this kind, covering so vast a scope and executed by a single hand, it is inevitable that there should be deficiencies and even some inaccuracies. The author would absolve all his friends who proffered advice and pray the reader kindly to pass by whatever inadequacies may seem to exist. He would ask all to recall the sage words of the author of II Maccabees 31–33: "To collect all that is to be known, to put the discourse in order, and curiously to discuss every particular point is the duty of the author of a history. But to pursue brevity of speech and to avoid nice declarations of things is to be granted to him that maketh an abridgment. Here then we shall begin the narration; let this be enough by way of a preface. For it is a foolish thing to make a long prologue and to be short in the story itself."

HENRY S. LUCAS

SEATTLE, WASH.
April, 1943

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Chapter I

BEGINNINGS OF MAN AND NATURE OF HIS CULTURE

In the whole domain of ethnology the old Evolutionary School is bankrupt.—Wilhelm Schmidt.

WHOEVER would seek the origin of things that in countless ways control mankind begins an arduous task. One can readily tell when the radio, motion picture, airplane, or automobile appeared, for he well remembers the time he saw the first of these or at least can talk with people who saw the first ones. But it is more difficult to imagine the days when the internal-combustion engine was produced when electricity was applied to machinery, when the sewing machine was invented, or when the first steam engine was constructed. Still more difficult is it to ascertain when the telescope and microscope appeared, who invented the printing press, or when the compass was first used. If one continues his quest, he soon discovers that all the things which he has taken for granted had a beginning. He learns that there was a time when the English language did not exist, when the Christian faith was yet unknown, when there was no agriculture, when animals had not yet been domesticated, when man did not even know how to make fire. To study these matters requires time and energy; but it is well worth the effort, for such study concerns all we deem significant in the history of culture and makes us intelligent participants in our civilization.

Culture and Civilization. Frequently employed with vagueness of meaning, the words "culture" and "civilization" present difficulties to beginners of history. The term "culture," derived from the Latin *cultura*, has become thoroughly established among anthropologists. Use of the word "civilization" is much older. Dissatisfied with its vagueness, anthropologists have abandoned it for "culture." These two words, however, are currently used to express the same concept, except that "culture" is more limited in area and time than "civilization." Hence, we speak of "Homeric culture" and "Western civilization." In this sense the word "civilization" is employed in the following pages.

Culture is a common way in which men live, think, and act. It comprises (1) a general adjustment to economic needs or to geographic

surroundings, (2) a common organization produced to satisfy social and political needs arising in these surroundings, and (3) a common body of thought and achievement. This includes art, literature, science, inventions, philosophy, and religion. The Pawnee Indians of the North American plains, for example, possessed a common way of living and thinking. They lived in tepees, and these were easily moved, for the braves traveled about in search of food provided mostly by buffaloes. They had horses, originally introduced by the Spaniards from Mexico, which enabled them to wander far and wide over the plains of the Mississippi and Missouri river valleys. Such hunting peoples were organized as tribes guided by a fully developed system of customary laws. They decorated their tepees and costumes and produced elaborate equipment for dances and other ceremonials. Further, they possessed religious ideas. Thus the Sioux Indians, who were closely related to the Pawnees, believed in a vague but somewhat personal divine force, which they called *wakan;* it governed all the material world they saw about them. Such a group of related habits, beliefs, and institutions is called a "culture." *A culture, then, is the characteristic attainments—social, political, economic, intellectual, artistic, and religious—of a group of people.*

Diversity of Cultures. A number of cultures differing greatly from each other are to be found on every continent. In Australia, for example, the aborigines of the arid interior have an ancient type of culture which contrasts markedly with the complex industrial, argicultural, and commerical life of the European whites living near them. In Africa there is a bewildering array of cultures. There are the immigrant European whites, the Arabs of the north, the primitive Hottentots, the even more primitive pygmies, or negritos, the negroes of the Gold Coast, the Berbers of the north, and the desert dwellers of the Sahara. Greater contrasts in culture can hardly be conceived.

Also in Europe we note a like diversity. The Lapps and Samoyeds of the extreme north differ profoundly from the other inhabitants of this continent. Compare also the commercial Netherlander, the argicultural Bulgarian, the industrial Belgian, the wandering gypsy, the shepherd Vlach of Greece, the peasant Russian, and the olive-raising peoples of Mediterranean lands.

In North America there are the Indians, the Mexican descendants of the Aztecs, the European whites, and in the extreme north the Eskimos. In South America the people of Tierra del Fuego have an ancient type of culture, and the white man on the same continent is European and possesses all the elements of modern culture. Equally striking are the cultural contrasts among the peoples of Asia. Diversity, therefore, is a marked feature of the history of culture.

We study the history of civilization by tracing patiently the basic factors composing each culture and especially, if we can discover them,

their first beginnings. At all times (1) we must note the geographic background of a cultural pattern. In tracing the civilization of Egypt, for example, we observe the physical features of the Nile River Valley, its narrowness, its great length, its delta, its comparatively rainless climate, its immense fertility, and except at the extreme south and north, its relative isolation from the outside world. Next (2) we must study the economic organization of the cultural scene, in this case, argiculture and cattle raising. Then (3) we should inquire into the social organization of the state that rose in the Nile Valley, a state that was mainly the possession of its divine rulers, the Pharaohs. And finally (4) it is necessary to study (*a*) the artistic forms, such as painting, sculpture, and architecture, (*b*) the thought, such as law, theology, and philosophy, and (*c*) the scientific ideas and practice of such a cultural scene, or complex, to use a more technical term.

Such a method should be followed whether we study ancient Egypt, medieval Germany, or modern America. The reader should note that in describing a culture we shall set forth whenever practicable (1) its geographical environment, (2) its economic basis, (3) the social and political structure of the people who produced the culture, and (4) some of its more important contributions to civilization. To comprehend all this is no easy task, but the labor spent to acquire an understanding of these complicated relationships is well worth the effort. Such study takes us out of the narrow limits in which we move and think so that we become conscious partakers of all the strivings of man.

Origin of Culture. How does culture begin? This question has caused much debate, and a variety of answers have been given. Some basic elements of our western European culture had their beginning in Egypt and Mesopotamia. But it is impossible to find out who invented such ancient devices as the potter's wheel, the bow drill, and the war chariot. Even in modern times, for which there is a wealth of literature, we find it difficult to name the men responsible for the many inventions in daily use. Most of us, for example, believe that Cyrus McCormick invented the reaper. But when we are asked who devised its automatic binding mechanism, few can name the person who produced this important invention—one of the most remarkable in the whole history of technology.

Philosophy of History. Inventions and discoveries are made by individuals and are scattered over the entire world by "diffusion." Briefly, the theory of diffusion states that few inventions or discoveries have been made independently in two or more places. The process of diffusion produces many variations, because men always endeavor to adapt inventions to their particular needs. Ideas also spread by diffusion. Every age produces its own culture; but many of its habits, ideas, inventions, and discoveries are derived from previous ages and are

passed on to succeeding generations. "Civilization," it has been well said, "is a contract between the great dead, the living, and the unborn."

The word "history," derived from the Greek, was invented by Herodotus, often referred to as the "Father of History." To him the word meant "study" or "investigation" of past times. This still is its meaning. It comprises the study of culture, the civilization of all ages. The student of history is first of all a finder of facts, discovering his data in all sorts of materials, which we call "sources." There are many kinds of sources, such as literature—prose or poetry—public documents, records of business transactions, law codes, archaeological remains, governmental institutions, language, customs, artistic productions, and religious beliefs. In addition, the student of history derives helpful ideas from the related studies of economics, sociology, and anthropology.

The student asks, "What is the meaning of this thing we call civilization?" This is a difficult question to answer, for it leads him into philosophical problems. Out of the efforts to discover the nature and purpose of civilization has sprung a kind of writing known as the "philosophy of history." The history of civilization as we propose to study it in the following chapters must be differentiated sharply from the philosophy of history. The historian investigates facts about culture, whether present or past, and relates them so as to create a picture of an entire cultural complex. Ideas about civilization should be based upon a thorough acquaintance with facts drawn from many cultures. Without such knowledge, ideas are certain to be mere guesses and hence erroneous.

We must therefore begin with the study of facts and not yield to the common temptation to philosophize on the basis of only a modest acquaintance with facts. Unfortunately, it is impossible for one man to acquire a full knowledge of the facts about past and present cultures. Often the facts he does not know happen to be the very ones that make his philosophy of history untenable. We should bear in mind, therefore, that any philosophy of history is merely provisional and that the person formulating such a philosophy must ever be ready to recast it in the light of new facts.

On the other hand, philosophies of history are valuable because they prove suggestive. A striking case is the most influential work of this kind in modern times, the *Philosophy of History* by the German philosopher Georg Wilhelm Hegel (1770–1831). This is truly one of the great books of the past century. Although no present-day historian approves of the way in which the facts presented in this book were selected, it nevertheless furnished readers with ideas about civilization.

Theories Regarding the Earth's Beginning. At the outset of our study of the history of civilization, we are forced to consider the profoundest of mysteries—the origin of things. The natural sciences, in

which the modern world has made such notable advances, do not help us much in solving these difficult problems. Chemistry deals with the organization of matter but has not yet penetrated the secrets of matter and its origin. Geology deals with rocks and earth forms but has not revealed their beginnings. Biology is concerned with organic things but has not advanced beyond arranging an evolutionary scale of plant and animal forms. Scientists, however, have shown by laboratory experiments that the earth is at least 1,850,000,000 years old. They declare that this staggering total of years must be assumed as the earth's age on the basis of the rate at which such radium-bearing minerals as thorium and uranium break up and produce other elements.

Concerning the actual origin of the earth we have only some theories, or rather hypotheses based upon too few facts to warrant their being described as theories. The one advanced in 1796 by the noted French scientist Pierre Simon de Laplace (1749–1827), known as the "nebular hypothesis," states that originally the vast space of the heavens was filled with a shining gas, which rotated, cooled, slowly contracted, and finally broke up into gaseous shells, each of which in turn contracted and finally formed the planets, stars, and asteroids.

Several objections have been advanced against Laplace's conceptions. In the first place, such a mass would rotate far too slowly to cause substances to break off. In the second place, a gaseous sphere could not possibly produce shells that ultimately would form solid planets and asteroids. To overcome these objections another explanation, the "planetesimal hypothesis," was advanced by Professors Thomas Chamberlin and Forest Moulton and modified by Harold Jeffreys. It states that the origin of the solar system was a great star, which exploded because it had drawn near another star. One mass of the exploded material developed into the sun while other masses continued to rotate and travel in orbits, finally forming planets and asteroids. Such hypotheses are interesting but cannot, of course, be proved experimentally or established by eyewitnesses and hence are outside the scope of history.

Finally life appeared, and this, too, seems an impenetrable mystery. Scientists have only vague theories to explain it. Some have held that germs of life may have come from other planets. Chemists have advanced the theory that life may have sprung from carbon compounds. But life, whether plant or animal, does not, so far as we know, spring from inanimate matter. And so the mystery persists.

If science and history cannot ascertain *why* and *how* the world and its life came into being, they have clearly shown *when* it first appeared. This is possible because geologists have learned that the earth itself has a history, the study of which is called historical geology, a branch of geology.

After the earth had come into existence some two billion years ago, unmeasured cosmic time came to an end. Geologic time began. But the earth's crust still was to undergo enormous changes. Some parts were raised, others depressed; some parts were eroded, others filled by wind-blown or water-carried dust. Evidence of these changes has been left and may be seen in rocks and soil.

Ages	Periods	Characteristics	Hypothetical dates
I. Azoic		No life discoverable	1,850,000,000 years ago
II. Archeozoic		First living creatures (larval)	
III. Proterozoic		Invertebrates	
IV. Paleozoic, or primary	1. Cambrian 2. Ordovician 3. Silurian 4. Devonian 5. Carboniferous 6. Permian	Animals of the sea First fishes First land animals Amphibians Insects Reptiles	
V. Mesozoic, or secondary	1. Triassic 2. Jurassic 3. Cretaceous	First dinosaurs and reptilian mammals Dinosaurs, toothed birds, and flying dragons Flowering plants, higher insects, and earliest mammals	
VI. Cenozoic *a.* Tertiary	1. Eocene 2. Oligocene 3. Miocene 4. Pliocene	Higher mammals	1,000,000 to 500,000 years ago
b. Quaternary	5. Pleistocene	Ice ages: appearance of man	500,000 years ago

Geologists have divided the past into ages and periods. For a long time there was no life whatsoever in spite of the fact that from the beginning of geological times the earth was chemically and physically fit for plant and animal life. For this reason no fossils have been found in the rock formations of this first age, which geologists have called the Azoic, or "lifeless." Another age followed, having fossil forms of larval life. Geologists have called it the Archeozoic Age because it was the first in which life existed.

The table shown above is an outline of geological ages and periods.

THE THEORY OF BIOLOGICAL EVOLUTION. The history of life from the time it first appeared in the Archeozoic Age to the rise of man in the Quaternary part of the Cenozoic Age has engaged the attention of many scholars. Since 1859 when Charles Darwin (1809–1882) published his ideas on biological development in his *Origin of Species by Means of Natural Selection*, the theory of evolution has become generally accepted as a possible and probable explanation of the history of plant and animal life. The theory states that life developed from the earliest simple forms through more complicated organisms until finally the highest form, man, appeared toward the close of the Cenozoic Age.

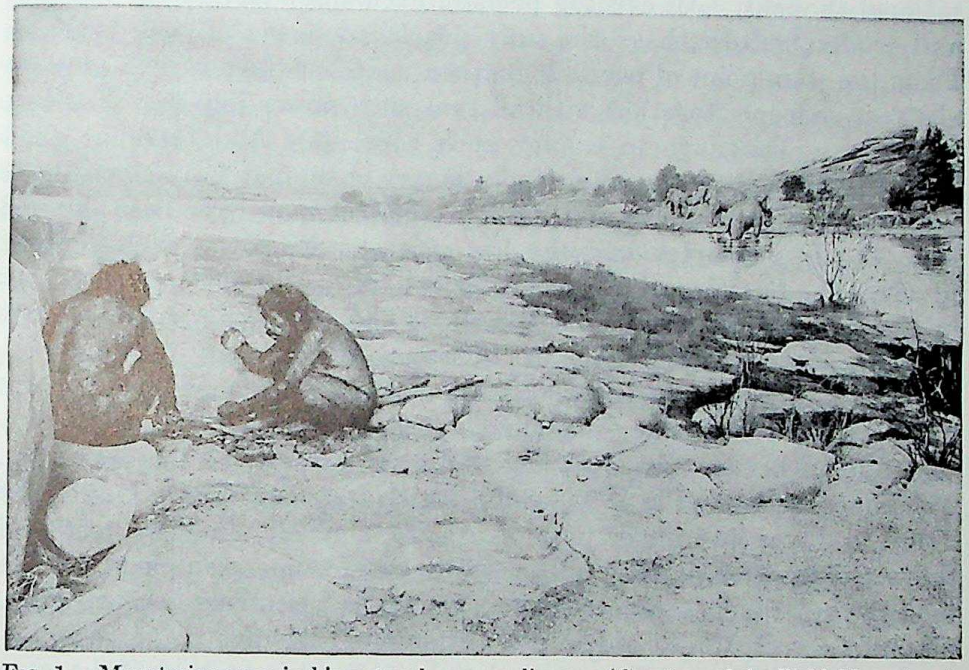


FIG. 1.—Mousterian man in his natural surroundings. (*Courtesy of the Field Museum of Natural History.*)

Proofs for this theory derive from (1) paleontology, the study of the fossils, which paleontologists have assembled and arranged in an evolutionary sequence as shown in the foregoing table; (2) embryology, a branch of biology, in which the embryo is studied and which likewise reveals an evolutionary development from the moment the egg is fertilized until the embryo is completely formed and mature growth attained; and (3) the study of comparative anatomy of the animal world, which shows considerable similarity between the anatomical structures of higher and lower forms of animal life.

From the facts gained by such study, biologists conclude that man belongs to the highest branch of the mammals, the primates. He bears

close physical resemblance to the anthropoids, of which several kinds—the gorilla, chimpanzee, orangutan, and gibbon—still exist. Just how man is related to them is an obscure matter. It is wise, therefore, not to assume too much on this point, because there are also great differences between man and his supposed anthropoid relatives. For example, the human brain is very large, the face very small, as compared with those of the highest apes. The human skeleton stands erect, on two feet; that of anthropoids is quadrupedal. But besides these and other physical differences, a veritable chasm looms between the mental character of man and that of the anthropoids. Man possesses the power of conceptual and rational thought. All existing peoples, even those having the simplest and crudest culture, have the fully developed power of such thought. From the standpoint of psychology, then, man has the power to produce abstract concepts together with all that such power implies. Further, he possesses language to convey such concepts. And there is much obscurity about how the whole evolutionary chain may have come about —how the more complex and the more perfect may have been derived from the less complex and the less perfect. Finally, this last point involves the question of a cause sufficient to explain not only each link in the evolutionary chain, but the entire chain as well. At this point the student enters the domain of philosophy and theology.

Man's First Appearance. It is impossible for historians of culture to know when and where man first appeared. Certain it is, however, that human beings existed during the latter part of the Cenozoic Age. The bones discovered in 1891 by the Dutch surgeon, Eugene Dubois, at Trinil in Java—the upper part of a skull, a femur, and two teeth—if they actually were parts of one creature, may be one example of man at that remote time. These remains, known to historians as Java man, probably constitute the oldest parts of human skeletons we possess.

Java man is generally supposed to have lived in earliest Pleistocene times. He walked erect, as is revealed by the markings where muscles were attached. Brain anatomists have decided he definitely did not belong to any ape family, his brain cavity showing a brain very different from any possessed by the anthropoids. Also to be noted is the fact that no artifacts have been found associated with the remains of the Java man. Facile theories about Java man's culture are bound to be unreliable.

Peking Man and Others. Similar in certain fundamental repects to Java man is Peking man, whose fossil remains were found in 1929 near Peiping (formerly Peking). They belong, it appears, to about the same period, that is, the Pleistocene. These skeletal remains, however, suggest a face somewhat more closely related to that of modern man.

Piltdown man, whose remains were found in England, may belong to a slightly later period. Rhodesian man, whose remains have been found

in southern Africa, is supposed by some to show that half-ape and half-human forms inhabited this part of the world very early, probably as contemporaries of Peking man. But there is considerable controversy concerning Rhodesian man, and some scholars believe that he is much later than Peking man. Heidelberg man, whose fossilized jawbone was found in 1907, is still more human; it is thought that he belongs to the middle portion of the Pleistocene Period. These forms are precious fragments enabling us to reconstruct something of man's mysterious past.[1]

Problem of Determinism. Many historical writers assume, wittingly or unwittingly, some principle of determinism, some controlling principle from which necessarily issue the physical, mental, and moral activity of man. Such a principle, consciously adopted or uncritically assumed, determines some historians' treatment of their subject. This is natural, for it would be strange if culture had no meaning. But this is a metaphysical problem, for it involves the entire realm of being; and here the historian and also his readers should tread warily.

Man certainly is a being based in chemical substances, but he does not act chemically. No amount of skill in chemistry or knowledge of that subject can explain man's culture. It is also true that man is a physical being, but his culture is something very different from physics. He is a biological being, but his culture is something exceptional to the activities of biological beings other than man.

No amount of chemical, physical, and biological study so far undertaken has unlocked the nature of culture, nor does it seem possible that such study ever will do so.

Not only is man an immensely complex being considered from the standpoint of chemistry, physics, or biology, but he is at the same time a being of subtle superiority. A chemical being, he can do what no chemical substance can do, grasp the science of chemistry. Having the power of conceptual thought, he occupies a category by himself, acts freely, is responsible for his acts, and knows something about the ends toward which he chooses to act.

Biological Evolution and Cultural Development. Students should adopt a critical attitude toward general ideas about the history of culture and ask if such ideas are in accord with the facts. They should be skeptical especially of the latest theories of civilization, for it is more

[1] The complex theme of biological evolution still bristles with difficulties. The reader is advised to consult a number of the better studies on the subject, as J. M. Cooper, "The Scientific Evidence Bearing upon Human Evolution," in *Primitive Man*, Vol. VIII, pp. 1–56, 1935; Sir Arthur Keith, *The Antiquity of Man;* T. H. Morgan, *The Scientific Basis of Evolution;* R. M. Yerkes, *The Great Apes;* and R. M. Yerkes and B. W. Learned, *Chimpanzee Intelligence and Its Vocal Expression.*

difficult to learn the facts than to form a flashy theory about them. This is illustrated by the loose use of the idea of evolution. People who are prone to talk about the "evolution" of religion, government, commerce,

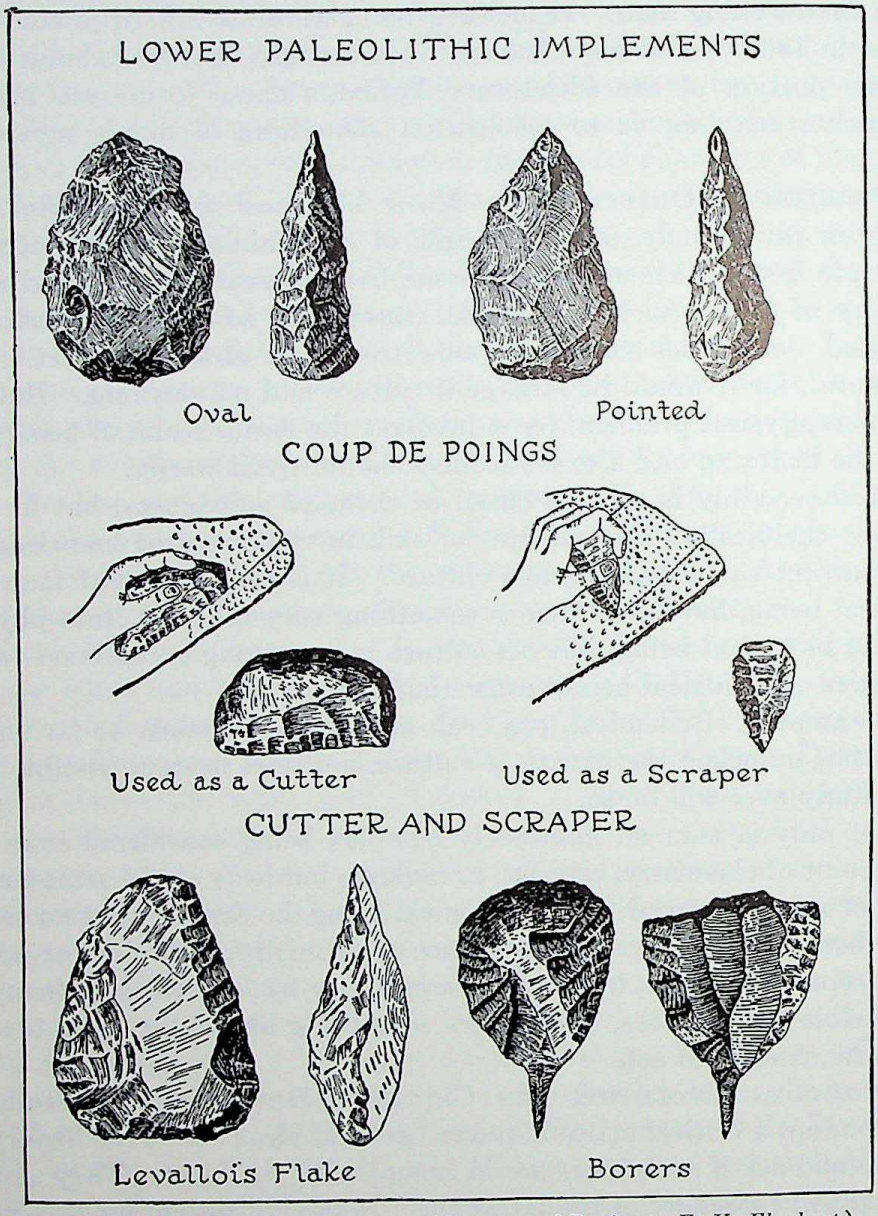


FIG. 2.—Paleolithic implements. (*Courtesy of Professor E. K. Eberhart.*)

industry, and the like should be reminded that evolution refers to organic things such as plants and animals. Culture, on the other hand, is a common way in which men live and think; it results from creative acts springing from man's freedom of will in the presence of all kinds of conditions.

Ninety years ago people began to talk about the "evolution" of civilization. It was assumed without proof that man everywhere started to travel the road of civilization under identical conditions, passing through the same stages of culture. It was believed there were three phases: hunting, pastoral, and agricultural. Many thought that there was a similar evolution in religion. They thought that all religious life passed through several stages: magic, animism, polytheism, and monotheism. Today no reputable anthropologist holds such views, and historians and sociologists should not subscribe to such ideas about the growth of civilization.[1]

Economic Determinism. Today it is the fashion to stress economic causes in the history of culture. There cannot be the slightest objection to studying the economic bases of civilization; indeed it is most necessary, for without such study a full understanding of the factors of civilization is not possible. There is a tendency, however, to assume that the economic basis is so fundamental that religion, art, philosophy, science, government, conventions of social life, and business organization are to be regarded as the necessary products of economic activity. Such a view, though easy to assume, is impossible to maintain under sober analysis. This type of thought owes its popularity especially to Karl Marx (1818–1883), who taught that all aspects of the culture of an age were necessarily caused by the economic life of the time.

Race and Culture. Most anthropologists believe that modern races have a common origin, but we lack the needed data to sketch the story of the formation of these several races. However, we find that at the threshold of history most of the human race is divided into three great families, the caucasoid, the negroid, and the mongoloid, the third including the American Indians. It is easy to make such a threefold racial division on the basis of color of skin, quality of hair, and a few other characteristics. But it is impossible to define with accuracy the idea of "race" or "blood." If we assume that man has lived on this earth perhaps a half million years and bear in mind that we can sketch his dated history during only a few thousand years, it seems rash to talk about

[1] Consider the words of a competent anthropologist, Dr. Paul Radin, in his *Primitive Man as Philosopher*, p. 373: "Most of us have been brought up in or influenced by the tenets of orthodox ethnology and this was largely an enthusiastic and quite uncritical attempt to apply the Darwinian theory of evolution to the facts of social experience. Many ethnologists, sociologists, and psychologists still persist in this endeavor. No progress will ever be achieved, however, until scholars rid themselves, once for all, of the curious notion that everything possesses an evolutionary history; until they realize that certain ideas and certain concepts are as ultimate for man as a social being as specific psychological reactions are for man as a biological entity." By "orthodox ethnologists" Dr. Radin means those anthropologists who assume that all cultural phenomena have developed along one evolutionary line.

"races," "mixed races," and the "purity of races." We know that there has been intermingling at all periods, so that today peoples are so mixed that we can unravel the racial snarl only in part. We know so little about the racial characteristics of our forebears that we shall do well not to entertain unscientific notions about what is popularly called "race" or "blood."

Racially the caucasoid, or white, peoples are exceedingly complex; but culturally the vast majority are more or less uniform, save for minor differences. Among these is language, which also has nothing to do with race. Thus the modern French have sprung from the peoples living in their country during Paleolithic and Neolithic times, who amalgamated with newcomers, Celts, Greeks, Latins, and Germans. Today they speak a language derived almost entirely from Latin. Yet we commonly call the French a Latin race, entirely oblivious of the fact that there is relatively little Latin blood in French veins.

So-called "racial" differences in Europe today are only slightly, if at all, racial; they are cultural. On the whole, race is relatively fixed, whereas culture changes unceasingly. The racial groups of western Europe have changed little during the past four or five thousand years. Yet today their culture is very different from that of the Dark Ages or even of so recent a period as the age of Louis XIV.

Sometimes groups change their culture in a few brief years. Thus the African negro brought as a slave to North America speedily acquired a totally new culture. The Japanese during the second half of the nineteenth century profoundly altered their civilization without undergoing any racial change. From these examples it should be apparent that the student of the history of civilization should devote far more attention to cultural than to racial phenomena. It is well to remember that the cultural unity of our Western civilization is a far more vital truth than its racial diversity. The reader will readily understand the far-reaching import of this fact.

It is unfortunate that science does not penetrate to the origin of things. Nevertheless, man persists in believing that this world and all things in it had a beginning. The study of such beginnings leads us straight into philosophy and especially into theology; but these studies lie beyond the immediate pale of history. The purpose of this book is to describe some of the central phenomena of civilization that man has developed through the ages. These interrelated phenomena comprise social, economic, and political problems as well as the development of art, literature, recreation, science, inventions, philosophy, and religion. We now turn our attention to the first evidences of man's creative work, in other words, the culture of the Paleolithic Age.

FOR FURTHER READING

BOSSARD, J. H. S. (ed.): *Man and His World*
BOULE, MARCELLIN: *Fossil Man*
BRADLEY, J. H.: *The Earth and Its History*
CONNOLLY, C. J.: *External Morphology of the Primate Brain*
DIXON, R. B.: *The Building of Cultures*
DU NOÜY, LECOMTE: *Human Destiny*
JAMES, E. O.: *The Beginnings of Man*
LOWIE, R. H.: *Primitive Society*
———: *The History of Ethnological Theory*
MACCURDY, G. G. (ed.): *Early Man as Depicted by Leading Authorities*
MALINOWSKI, BRONISLAW: "Culture," in *Encyclopaedia of the Social Sciences*, Vol. IV, pp. 621–645.
MORRISON, A. C.: *Man Does Not Stand Alone*
MOULTON, F. R.: *The World and Man as Science Sees Them*
MURDOCK, G. P.: *Our Primitive Contemporaries*
NEWMAN, H. H.: *The Nature of World and of Man*
PEAKE, H. J.: *Early Steps in Human Progress*
——— and H. J. FLEURE: *The Corridors of Time*, Vol. I
PETRIE, W. M. FLINDERS: *The Revolutions of Civilization*

Chapter II

DAWN OF CULTURE: THE STONE AGES

The quest of origins has always been fascinating to mankind; it is the natural outgrowth of man's endeavor to link cause with effect.—G. G. MacCurdy

THE earliest creatures we may call men apparently had spread over much of the earth's surface by early Pleistocene times. This is evident from such skeletal remains exhumed by archaeologists as Java man, Peking man, and Piltdown man from England. These

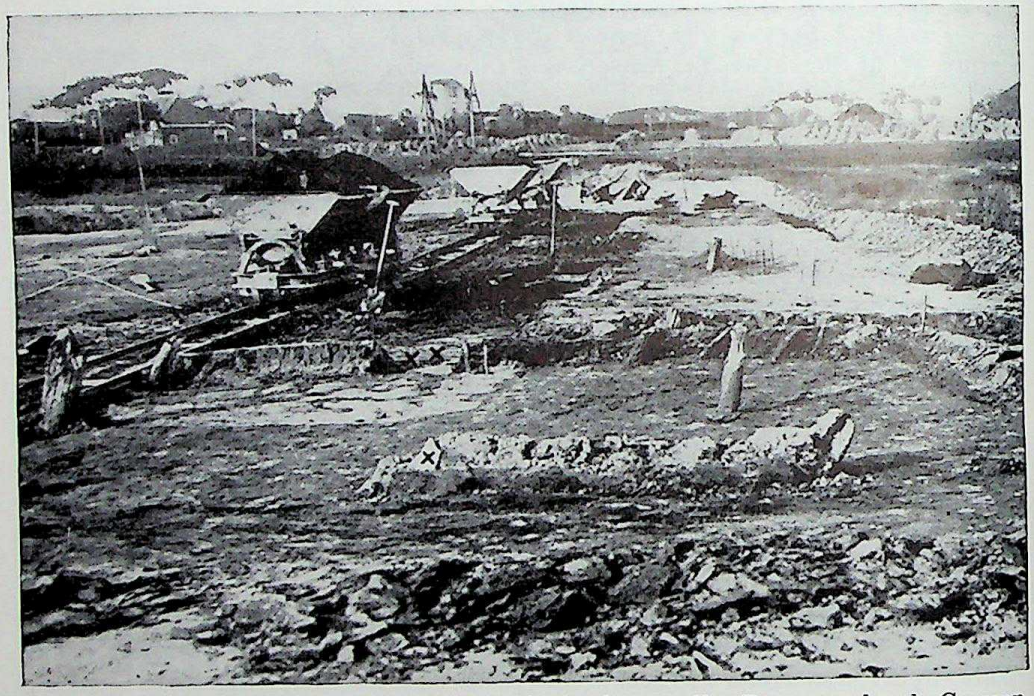


Fig. 3.—Archaeological excavation in the Netherlands, revealing Roman and early German building foundations. (*Courtesy of Martinus Nijhoff, The Hague.*)

early men were roving food seekers, for they had not yet learned to produce food by means of agriculture or cattle raising. Their life perhaps resembled that of many of the Kubus of Sumatra, a people possessing a very primitive culture. The Kubus have no stone weapons but rely upon bamboo spears hardened in fire. They have few clearings and raise practically no food but wander about the forest collecting fruits,

roots, and wild honey, catching game, and appropriating the carcasses of animals. They have no fixed places to live but erect the simplest shelters from branches and palm leaves. Such probably also was the life of our ancestors during untold ages in the Pleistocene Period.

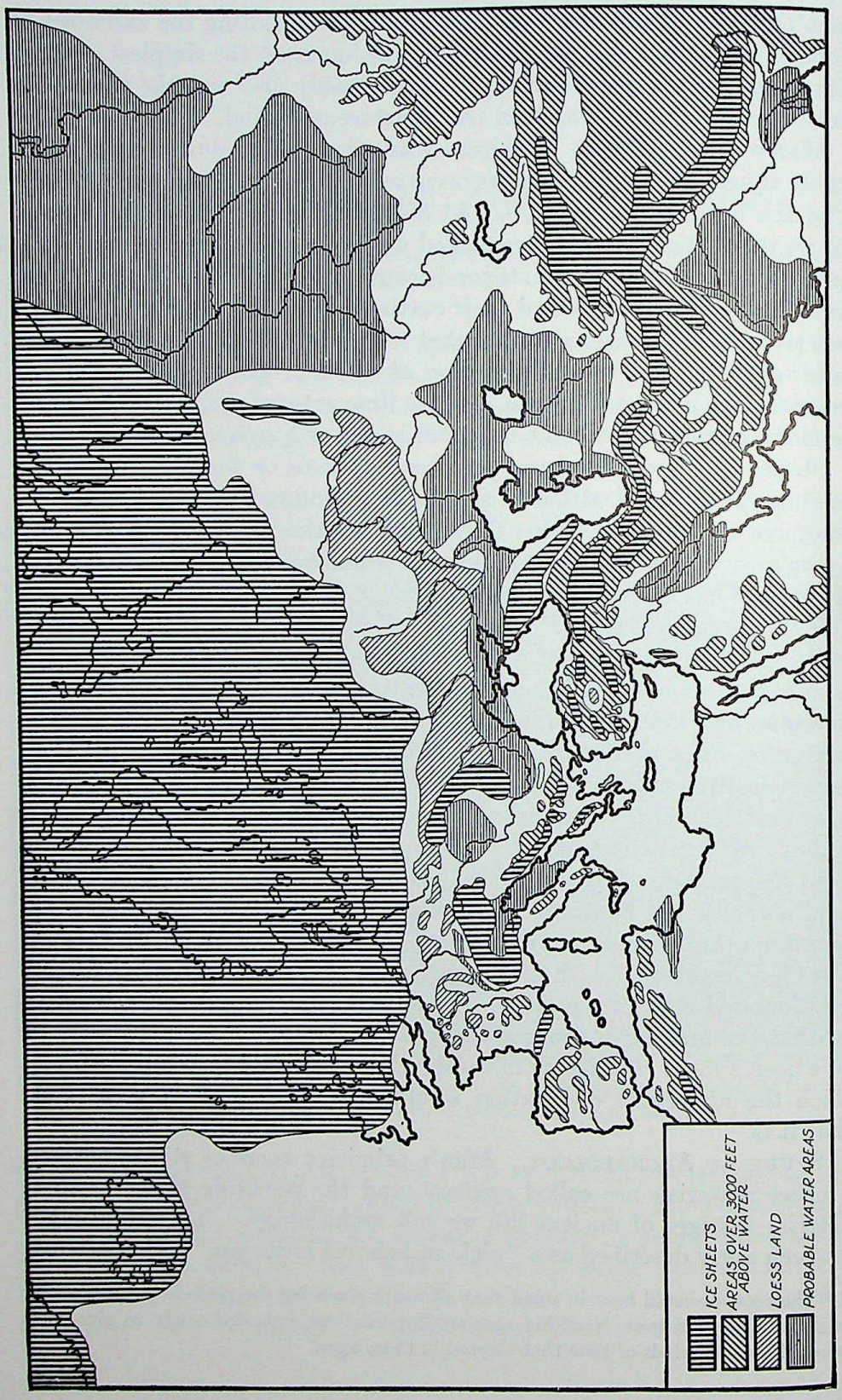
Man's First Tools. Progress was exceedingly slow during those remote times; but such change as occurred was momentous, for it proved to be the beginning of culture. At first, man apparently used as tools and weapons sticks and stones picked up at random. Then some early man discovered that these stones became more effective if they were struck against each other and their cutting edges thus improved. However, we are by no means certain that man's first tools or weapons were made of stone; they may have been of wood or bone. Whatever the materials of his first tools, man at some time entered upon his career as a toolmaking creature, a habit that still is one of his characteristics.

Stones that probably have been used as tools or weapons by earliest man have been found, although such is their crudity that some archaeologists have questioned whether they really are the first weapons of primitive man or are merely the accidental handiwork of nature. But the tendency of late is to regard at least some of these objects as man's oldest extant tools made of stone. They are called "eoliths" or "dawn stones," and the first cultural age of man is therefore named the Eolithic (about 500,000 years ago).[1] It belongs to the earliest Pleistocene Period, when Java man and Peking man lived.

Use of Fire in Primitive Culture. In addition to making tools, early paleolithic man also knew how to generate fire and employ it in many practical ways. But as nothing definite is known about the earliest methods of generating fire, we have only some suggestive hypotheses about the subject. It may be that primitive man obtained his fire from wood set afire by lightning or spontaneous combustion. Striking fire from flints probably came much later. We must, however, content ourselves for the moment with such vague statements and not indulge further in unfounded scientific romancing. Nevertheless, it is proper to point out that the making of fire is a skill possessed only by men; that it must have been a most vital factor in the development of early culture, without which the history of civilization would have been very different from what it is.

Study of Archaeology. Man's primitive tools of stone, pottery, or other material, are called *artifacts*, and the scientific study of these material vestiges of ancient life we call archaeology. An archaeologist has been aptly described as a "pick-and-shovel historian." He patiently

[1] The reader should bear in mind that all dates given for the periods in the Eolithic and Paleolithic and even Neolithic ages are hypothetical, intended solely to give some idea of the vast periods of time that elapsed in those ages.



Map I.—The ice age in Paleolithic times.

explores sites where early man has lived and by laborious digging and painstaking study of the artifacts discovered tries to reconstruct the remote life of which he has found a few material remains. Archaeology has so enormously enriched our knowledge of the past, especially the earliest ages of man's existence, that it has become a most important branch of science. Though archaeological progress has been compara-

Period	Cultural division	Characteristics and artifacts	Human remains	Hypothetical dates
Pliocene (close of)	Eolithic	First implements		500,000 years ago
Pleistocene:	Paleolithic:			
First glacial and second glacial period	I. Pre-Chellean	Crudely chipped nodules of stone. First traces of use of fire	Java man. Peking man	300,000 years ago
Third glacial period	II. Chellean	More defined forms of chipping and use of fire widespread		150,000 years ago
	III. Acheulean (two stages)	Hand ax tools chipped on both sides. Increased technical efficiency	Heidelberg man	
Fourth glacial period	IV. Mousterian (two stages)	Flakes with rudely chipped edges. Burial with offerings for the dead. Stone tools hafted	Neanderthal man	
	V. Aurignacian (three stages)	Flakes chipped on edge with surface chipped. Beads. Use of stone and bone. Painting on stones. Bone incisings and stone sculpture	Grimaldi skeletons Cro-Magnon man	25,000 years ago
	VI. Solutrean (three stages)	Entire surface of flakes chipped. Chipping now a fine art. Needles with eyes. Pressure flaking		
	VII. Magdalenian	Chipping declines. Bone points come in. Harpoons of bone and horn. Polychrome painting with composition. Incising of bone	Modern physical types	10,000 years ago

tively slow because of costly excavations, much digging has been done in recent years, particularly in Egypt and the Tigris-Euphrates Valley.

Many more discoveries remain to be made—a continual lure to archaeologists. Particularly is this true of the culture of the Paleolithic Age, or Old Stone Age. After much digging and study during the past hundred years, archaeologists have succeeded in drawing up a sequence of cultures beginning with the Eolithic Age and continuing into the Paleolithic Age and its successor, the Neolithic. The table shown on the preceding page outlines the cultures of the Eolithic and Paleolithic ages, based on the discoveries in France and elsewhere.

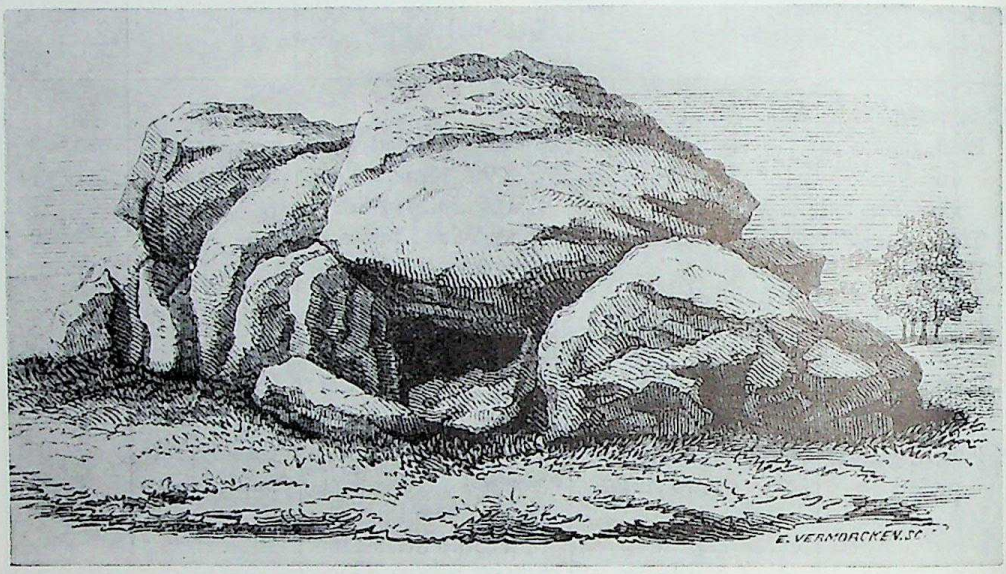


Fig. 4.—Megalithic tomb in the Netherlands.

A Note of Warning. At this point a word of warning seems necessary. Men are vitally concerned with the historical origin of civilization as well as with the metaphysical and theological aspects of this problem. It is not strange, therefore, that many answers to this persistent question have been offered, founded usually upon insufficient evidence and improper use of artifacts at hand. Still so uncertain is our knowledge about the remains of the Eolithic and Paleolithic ages that experts disagree about the exact place they should occupy in any table concerning the culture of earliest man. Material remains—stone axes, for example—tell us something of the practical uses that may have been made of them; but they can give us only the scantiest clues about the social and religious life of the group to which the persons who wielded such axes belonged. The occasional artifacts of these ages cannot tell us much about the real life and thought of the earliest human beings. Neat generalizations about the language, religion, liturgy, tools and weapons, and social organization

of primitive peoples, therefore, should be viewed with distrust. We ought to be skeptical of the grand evolutionary schemes facilely propounded fifty years ago, which, upon the scantiest foundations, described some vast process of development that obviously owed its inspiration to philosophical preconceptions.

The Glaciers of Europe. The history of paleolithic culture is closely bound up with the Glacial periods, which, as shown in the preceding table, followed the close of the Pliocene Period. No one can explain why icecaps at four successive periods extended from Arctic regions over Europe as far as the southern Alps and over vast areas of Asia and North America. Always between these Glacial periods, at least in Europe, there was a warm age marked by human activity. It is safe to presume that human activity continued in a limited degree in these regions during the more intense cold of the ice ages. We may further assume that during such times men lived in the lower river valleys and along the coasts, where they built shelters and secured food.

Pre-Chellean, Chellean, and Acheulean Cultures. By reference to the table on page 17, the reader may study the cultures of the Paleolithic Age that the archaeologist's pick has brought to light. Each type shows an improvement on the skill developed by the men of preceding periods. Pre-Chellean and Chellean man made striking improvements upon eolithic tools.[1] The former still used crudely chipped cores of flint; but Chellean man made almond-shaped fist hatchets about five or six inches in length, carefully chipped and regular in shape. Acheulean remains dating from the warm period after the third glacier had retreated show greater skill in shaping flints. These artifacts constituted at least a few of the handy tools or axes of the hunters of the time, who grasped them at the thick end and hacked with the sharp point at foes or animals. When held by the narrow end, the tool became a primitive hammer.

Mousterian Culture. The next cultural area in Paleolithic times is the Mousterian. It came into existence during the final and cooling part of the third interglacial period, continued into the fourth Glacial Period, and developed for the most part under the stress of cold weather. Mousterian, or Neanderthal, man was short in stature and had large bones, sloping shoulders, and a protruding face. A heavy ridge extended over his eyes, and his massive lower jaw was most prominent. To protect himself from the increasing cold, he retreated into caves, where

[1] Archaeologists have adopted the practice of identifying particular cultures by the locality of their most important finds. Hence we have Chellean, Acheulean, and Mousterian cultures named after the towns of Chelles and St. Acheul and the Moustier cave in France. The remains of Cro-Magnon man were found in the caves of southern France. The designation of the other periods from Aurignac, Solutré, La Madeleine, Le Mas d' Azil (Azilian), Fère-en-Tardenois (Tardenoisian), and Campigny (Campignian), all in France, is obvious.

archaeologists have dug up rich treasures of flint tools and skeletal remains both human and animal. It must not be assumed, however, that Mousterian man lived only in caves. He probably built temporary wattle shelters in the woods or open country; but these have disappeared without leaving the slightest traces.

The tools of Mousterian man marked a signal advance upon those of his predecessors. Some inventive genius of the Mousterian Age discovered that flint split readily if pressure was applied at the proper point. This process, called pressure flaking, enabled men to produce far

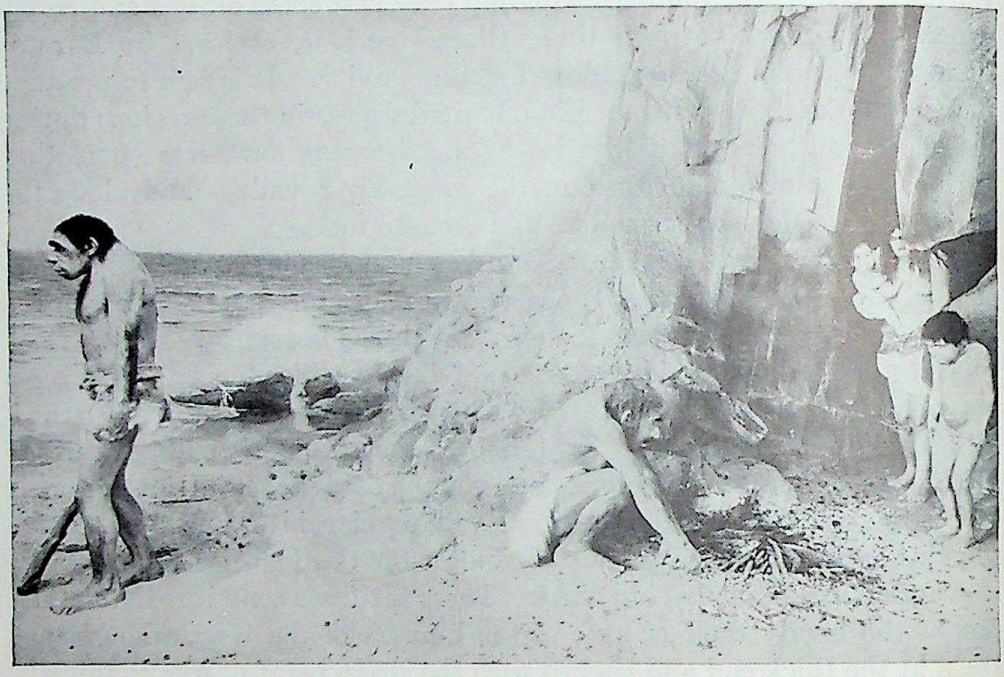


FIG. 5.—Neanderthal man. (*Courtesy of the Field Museum of Natural History.*)

better tools than heretofore. In addition to the ancient heavy ax, which continued in use, there appeared improved and surprisingly effective scrapers, awls, knives, saws, and javelins. Even the flaked pieces, formerly wasted, were now turned into knives and other useful tools. For flint was not a plentiful material, and making tools by pressure flaking meant a great economy over the old method. Above all, Mousterian man was a hunter, skilled at slaying bears, whose hides provided warm clothing. Mousterian culture, like the cultures of the earlier Paleolithic Period, was widely diffused throughout Europe, Asia, and Africa.

CRO-MAGNON PEOPLE. Next came the late Paleolithic Period. Modern man's ancestors appeared with the Cro-Magnon race, whose skeletal remains have been found throughout Europe as far east as Bohemia. They were tall and handsome, with a brain content somewhat larger than that of modern men.

Mousterian man vanished; whether he was killed off or absorbed by others who came after him we do not know. The first stage of late paleolithic culture is the Aurignacian, found in France and eastward as far as Lake Baikal. Numbers of knives, points for piercing hides, scrapers for cleaning hides, and javelin points, all made from chipped flint, besides bone objects obviously used as tools, have been found in kitchen refuse. Although the great glaciers had retreated, the weather was still cold; and Cro-Magnon men, like their Neanderthal predecessors, seem to have sought shelter in caves and survived by wearing the furs of animals.

Solutrean Culture. Following the Aurignacian appeared the Solutrean culture, possibly produced by a people distinct from the Cro-Magnon. Solutrean men were even more expert in chipping flint than their Aurignacian predecessors. They struck off long, thin, and narrow flakes, which by retouching could readily be made into all manner of useful objects. Their weapons and tools were beautifully regular, finely chipped on both sides, veritable works of art. They also produced scrapers, saws, knives, drilling tools, awls, javelin points, bone needles provided with eyes, and slender flint darts with notches at the end.

Magdalenian Culture. The final phase of paleolithic culture was the Magdalenian. Bone was relied upon very generally, and a large variety of weapons was developed. Javelins, lances, knives, barbed harpoons, arrows, bows, and needles were common. The use of flint declined because of a preference for bone, but flint saws were still widely employed. This decline is explained by the fact that Solutrean and Aurignacian technique became obsolete.

The material culture of the Magdalenian people closely resembled certain aspects of modern Eskimo material culture. Some scholars have argued unconvincingly that the Magdalenian and modern Eskimo cultures are two aspects of one and the same culture, even though separated by thousands of years.

Difficulty of Reconstructing Early Culture. From a study of such flint and bone tools—those made from wood and other materials, it should ever be kept in mind, have all been lost—it is possible to reconstruct to some extent the material culture of paleolithic man. But much escapes even the patient student, for the social organization, religious ideas, and much of the earliest art have disappeared. We try to reconstruct these from the comparative study of peoples having a primitive culture who are still living or who have vanished only recently. Hence the keen interest in the primitive Tasmanians (extinct since 1879), the aborigines of Australia, the Punans of Borneo, the Sakais of the Malay Peninsula, the Aätas of the Philippine Islands, the Negritos of the Andaman Islands and the Malay Peninsula, the Fuegians of South America, and the northern Athapascans of North America. It is believed that their

habits may give us clues about the life and thought of paleolithic man of a hundred thousand or more years ago. Cultural anthropology, which deals with such themes, helps immeasurably toward an understanding of man and his civilization.

But a word of warning is necessary at this point. Great caution must be exercised in trying to reconstruct the culture of our earliest

FIG. 6.—Wall painting in Cro-Magnon times. (*Courtesy of the Field Museum of Natural History.*)

ancestors. Writers are inclined to make sweeping generalizations. Not many years ago, it was held that civilization evolved from simple beginnings believed to have been the same in practically all lands wherever paleolithic man lived. From the point of view of present-day cultural anthropology, such theories are untenable. We should always bear in mind that even though the cultures of Paleolithic times may have been simple, there was in all probability the most perplexing cultural diversity as early as the dawn of Chellean times. Already there must have been a confusing variety of languages and a welter of racial types.

PALEOLITHIC SOCIAL FORMS. Just what do we know about the social forms of paleolithic life? Archaeologists have discovered chipped flint

and bone tools, which show that their makers possessed some culture. They teach us that paleolithic man was a hunter, a forager for food. Unfortunately, such artifacts do not permit us to reconstruct fully the life of these people. But we may make certain assumptions.

At this point a most difficult question confronts the student—the origin of culture. That culture is based upon man's unique ability to think conceptually and rationally is certain. Only rational beings create

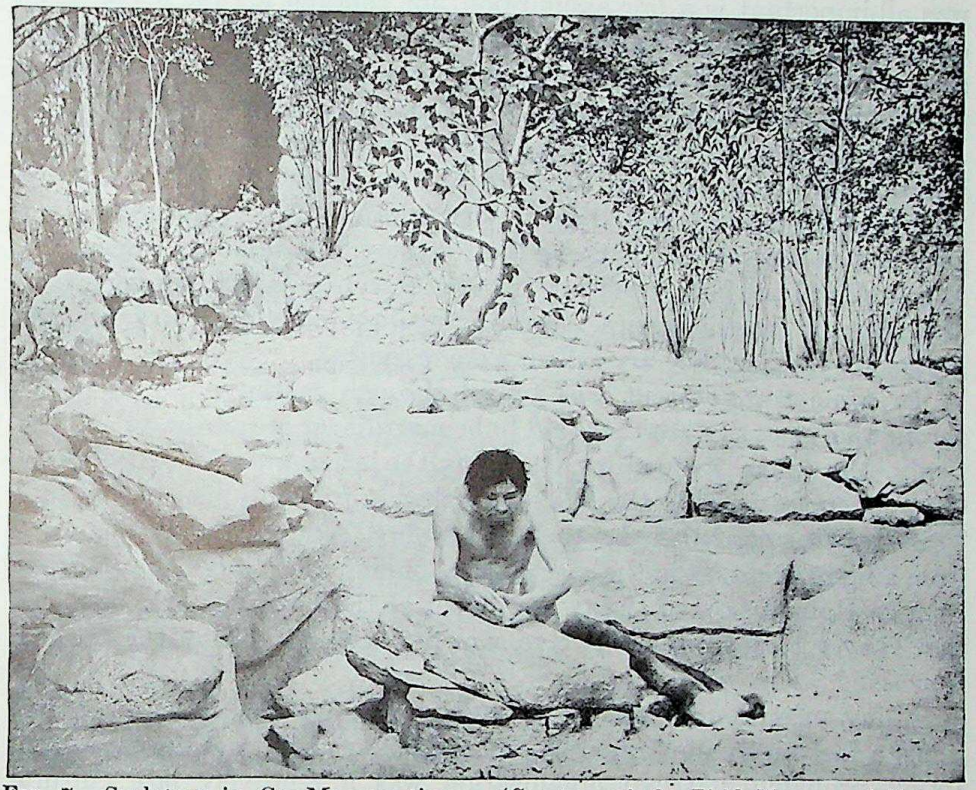


FIG. 7.—Sculpture in Cro-Magnon times. (*Courtesy of the Field Museum of Natural History.*)

culture. Hence culture is something unique in the realm of creatures. As conceptual thought and rational action are absent among anthropoids, a knowledge of the habits of the latter does not help us much in trying to determine how culture began, nor even what culture was like in the beginning, and of course it cannot give us much direct insight into the nature of culture as history reveals it to us. But we may be certain that in the beginning men were monogamous and did not live in sexual promiscuity, for the human infant could scarcely survive without the institution of the family. Every bit of evidence coming from the study of anthropology indicates that our first parents were religious. The earliest graves that contain evidences of religious practices, which date from Mousterean times, show that religious beliefs have a long history. For all these reasons it seems certain that earliest man was monogamous, did not live in

sexual promiscuity as some writers have supposed, and displayed the greatest inventive ability.

Beyond such simple assumptions it is hazardous to generalize. We must bear in mind that primitive man, like his present-day descendant, was an industrious worker. His culture never was stationary even in the most unprogressive ages. He no doubt lived in small groups, in which family life regulated most aspects of cultural activity. That the family was all-important is a fair assumption; for children are for many years completely dependent upon their parents for food, clothing, protection, and instruction. Without some family organization it was impossible for primitive mankind to survive.

Undoubtedly there were many types of social organization in Paleolithic times. Some scholars have tried to reconstruct them by studying the life of peoples having a primitive or backward form of culture. They probably are correct in assuming that, inasmuch as family life regulated most cultural activity, groups or tribes were conceived as forming a kind of family or kinship group. But it remains uncertain just how such groups, or sibs, as they are called, were organized.

In some sibs, descent was traced through mothers and in others through fathers; sibs are thus said to be matrilinear or patrilinear, respectively. The former are also called clans, the latter *gentes* (singular, *gens*). Our custom of naming through the father is probably an ancient one. This idea was carried so far that tribes often believed they had sprung from a first parent, as in the case of the Romans, who traced their history back to Romulus, or of the twelve tribes of the Israelites, who believed that they sprang from the twelve sons of Jacob, as told in the book of Genesis.

Many primitive peoples living today have no such tribal organizations, a fact nicely illustrated by the Indians of the Puget Sound region. In all probability, tribal organization was a relatively late cultural phenomenon and by no means universal.

Totemism still is a feature of certain groups in Australia and along the Pacific coast in North America. Each group, or sib, is named after an inanimate object or animal, as, for example, a bear, a fish, or an eagle. In some cases the members of a totem may not harm, kill, or eat their totem animal. Scholars have found it difficult to say in just what totemism consists apart from sib organization. Nor is its connection with religion easy to ascertain. In all probability, it, too, is a late cultural phenomenon and by no means universal. A vast amount of discussion has been devoted to totemism, but so long as the subject is not clearly understood students should pay little attention to sweeping statements made about it.

Custom and Myth. Primitive tribal groups possessed social habits or customs that took the place of what in modern society is called law.

Customs were of course unwritten, perpetuated in the minds of the older members. Perhaps this is the reason for the special respect shown for the wisdom of old folk in primitive society. One custom in many early groups was that of blood revenge, whereby one group exacted from another a penalty supposedly equal to the harm it had received. If a person had been killed, his tribal kinsmen retaliated by killing one of the slayer's kin.

Myth also played a great part in the thought and practice of primitive folk. We often assume that myths are idle tales, but this is wrong. To many primitive peoples, myths explained all sorts of tribal activities and traditions, which were traced back to some great first event in which the gods were involved. Thus the kings of the Ostrogoths who invaded the Roman Empire in the fifth century A.D. explained their royal position by the fact that they had sprung from the gods. In primitive times, therefore, myth played the part that history and other social studies play in modern society.

Religious Beliefs. Religion is a most complex element in primitive culture. Sweeping generalizations concerning it are common, but most of them are untenable. The best we can do in studying the religion of paleolithic and neolithic peoples is to seek clues from the beliefs of groups still living in the hunting stage, as, for example, the Australian aborigines.

It appears that all primitive people had some form of religious belief. So far as the problem of getting food and providing himself with clothing and shelter was concerned, paleolithic man managed well. But it was a different matter when he faced the great crises of life, such as disease, pestilence, wounds, death, drought, and war. At such times he was quite helpless.

Like his modern descendant, earliest man felt keenly his dependence upon the mysterious power that sustains the earth, sky, and all life. Primitive man universally believed in supernatural forces. From this supernaturalism sprang many of his cultural traits. In respect to mental equipment, paleolithic and neolithic men were much like their present-day descendants. Some paid little heed to speculations about the nature of things around them. Others, however, reflected on the expanse of the earth, the mysterious skies, the difficulties of life and its dangers, the riddle of birth, pain, and death, and the question of right and wrong. Thus an Indian of the Oglala tribe—whose culture, however, is far more advanced than that of paleolithic man—said the following:

> When I was ten years of age, I looked at the land and the rivers, the sky above, and the animals around me and could not fail to realize that they were made by some great power. I was so anxious to understand this power that I questioned the trees and the bushes. It seemed as though the flowers were staring at me, and I wanted to ask them, "Who made you?" I looked at the moss-covered stones; some of them seemed to have the features of a man, but

they could not answer me. Then I had a dream, and in my dream one of these small round stones appeared to me and told me that the maker of all was wakan tanka and that in order to honor him I must honor his works in nature. The stone said that by my search I had shown myself worthy of supernatural help. It said that if I were curing a sick person I might ask its assistance and that all forces of nature would help me work a cure.

This is the thought of a primitive thinker, the medicine man, the spiritual leader of his tribe.

Such elevated thought was more or less uncommon. On the other hand, the average primitive man apparently believed in magic. The many varieties of magic make it impossible to define magical art in a few words. In nearly every case, it deals with impersonal forces. Imitative magic is based on the belief that by imitating the thing one longs for one may secure it. A Hopi Indian who draws a picture of clouds with rain dropping from them in order to produce rain is practicing magic. So are Australian aborigines who fill their mouths with water and squirt it in various directions so that there may be rain.

Spells are another form of magic. They consist of words sung or recited in order to produce a supernatural result. Divination is still another form of magic seeking the answer to perplexing problems. The mongoloid nomads of the Asiatic steppes held the shoulder blade of a sheep or a deer over a fire and interpreted the way it cracked as a revelation of supernatural will. There also were taboos. Certain things regarded as bad were avoided. Amulets and fetishes likewise played their part in giving the wearer magical protection against unseen evils.

Animism, another early type of religious belief, gives to inanimate objects a life or soul. Trees, rocks, mountains, and volcanoes were thought of as personalities moved to personal resentment when aroused by erring man. Much of the familiar mythology of the Greeks deals with animism, examples of which may be found in all primitive cultures.

Another possibly early form of religious faith, known by the term *mana*, is the belief that a supernatural force governs all, that behind all things men see and all things which happen resides a universal and impersonal supernatural force. Mana differs widely among the various tribes and is by no means universal, being confined almost entirely to Melanesia and Polynesia. It apparently is a universal, philosophical principle based on simple magical power.

Besides magic, animism, and mana, there also was a belief in a supreme being, the creator and sustainer of all. Evidence of the widespread existence of such a belief in a more or less personal god has accumulated during recent decades. The Samoyeds of northern Europe and Asia and the Fuegians of South America believe in a supernatural being

with whom men may communicate. Such a god becomes the center of worship, for it is believed he may help men in trouble. Such a faith, more or less monotheistic, is often associated with magic, animism, and mana. These facts are especially interesting because they disprove the theory still widely held that monotheism first appeared in human history long after Neolithic times.

There is no evidence of religious beliefs among the remains of Chellean and Acheulean men. But this does not signify that they had none. In the Mousterian Period following, skeletons have been found carefully buried with weapons, tools, offerings of food, and other objects. The

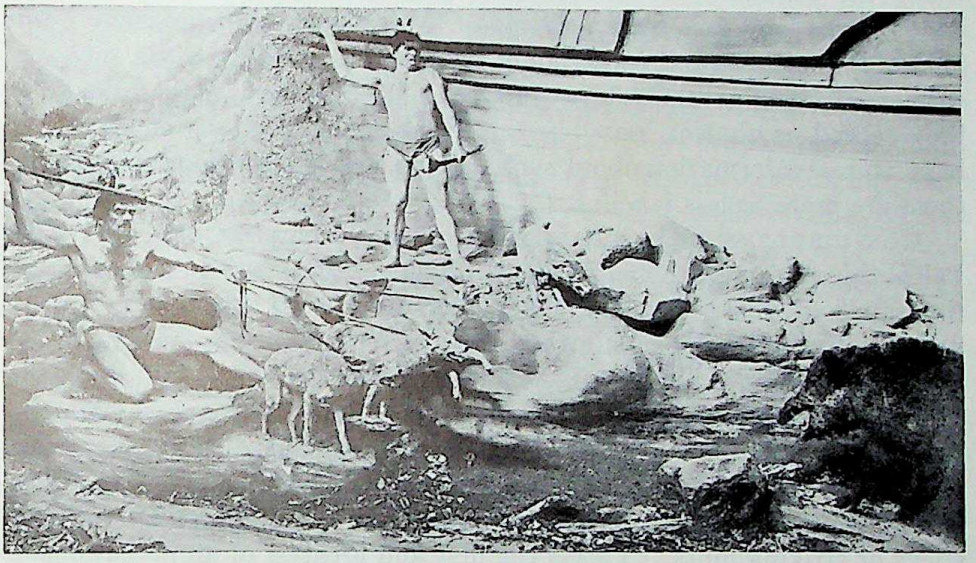


FIG. 8.—Hunting at the close of the Paleolithic Age. (*Courtesy of the Field Museum of Natural History.*)

most reasonable interpretation of such burial phenomena is that these people believed the spirits of men beyond the curtain of death needed the tools and weapons and food to which they had been accustomed while in the flesh. Cro-Magnon man in the later Magdalenian Period has left many material remains that some scholars interpret as proof of animistic or magical cults. In the caves of France and Spain, we find drawings of horses, asses, bears, bison, reindeer, mammoths, stags, and other animals. Those in the caverns at Altamira in Spain are especially good works of art. Rarely in later times has man drawn animal forms with greater truth and vivacity. Magdalenian man drew pictures of animals with arrows piercing them to the heart, which raises the question whether these drawings may have been made for magical purposes, though it is just as possible that the animals were portrayed for other

reasons. Belief in the hereafter among Magdalenian man is indicated by burial of flints, tools, and necklaces of bone along with the corpses.

Especially interesting are the religious ideas of the Aurignacian Age. The people of this period apparently were impressed by the perpetually re-creating aspects of nature. They noted that deer produced deer, bison produced bison, that, in fact, the entire animal world thus perpetuated itself. Men too reproduced themselves, and this riddle of the world in which he lived prompted Aurignacian man to explain his deepest interests on the basis of sex, which to him appeared a subtle explanation of the mystery of life. So he made statuettes of the human female in which the buttocks were exaggerated and other features such as feet, hands, arms, and face were neglected. Many such figurines have been found; but although the preceding explanation of their style may be correct, it remains a mystery how such images were used. Possibly they served as charms, possibly they were mere creations of art. We have no real information about such objects, and speculations concerning them are more or less fanciful.

Contributions of the Paleolithic Age to Later Culture. The Paleolithic Age came to an end about 12000 B.C. after having lasted many thousands of years, possibly 125,000 or 200,000 or even more. This period is by far the longest in the history of culture. To us living in an age of automobiles, airplanes, natural science, and medicine, progress during the period seems to have been very slow. But we should not despise the apparently modest achievements of our distant ancestors. They learned to make use of fire during pre-Chellean or Chellean times and in Mousterian times certainly knew how to make fire by rubbing sticks or striking flints. This is the first and greatest of all inventions—an achievement without which most of our activities today would be impossible. They invented the bow, of which there are many pictures in the cave decorations of western Mediterranean lands, in the time immediately following the Magdalenian Period. They also invented stone fist hatchets, knives, drills, arrow points, spear points, awls, and flesh scrapers. Further, they had some form of religion, a social organization, much artistic skill especially toward the end of the Paleolithic Age, and a fund of practical knowledge. These things constituted a precious legacy to future ages.

The Neolithic Age, or New Stone Age. The next age, the Neolithic or New Stone (about 12000 to 6000 B.C.), was of the utmost importance in history, for immense changes in culture occurred. To grasp the difference between it and the preceding Paleolithic Age, we should remember that paleolithic man was a food gatherer, a hunter subsisting on animals and fish, whereas in the Neolithic Age new habits developed that revolutionized old established ways. Man became a

producer of food by growing crops and raising animals. Forms of neolithic culture seem to have spread over the whole area where paleolithic culture is found and even appeared in such new places as Japan and America.

Europe during the succeeding ages became the abode of various peoples whose origin remains unsolved. The population was caucasoid, or white; but new elements entered to make it complex. In central Europe dwelt the so-called "Alpine" type of people, who lived eastward as far as the Russian plain. They moved into western Europe and probably are not descendants of the longheaded Cro-Magnon man of paleolithic times, for they had round heads, were shorter in stature, and had dark hair. South of them lived the "Mediterranean" type, longheaded, taller, and of dark complexion. Northern Europe was occupied chiefly by tall, blond, longheaded peoples; they are often called "nordics." From the earliest beginnings these peoples mingled, and modern Europeans descend from them. For this reason it is impossible to find an "unmixed race" in Europe, even though certain physical characteristics persist. The reader is cautioned against accepting any easy theory of "pure races" as the basis of European civilization or any other civilization.

As in the case of paleolithic culture, archaeologists have divided the Neolithic Age into type cultures. These are listed in the following table:

Period	Cultural division	Characteristics and artifacts	Hypothetical dates
Eolithic	See table, page 17		To 500,000 years ago
Paleolithic (seven divisions)	See table, page 17		500,000 to 12,000 years ago
Transitional Neolithic	Capsian (late)	Sharp chipped knife	10000 to 6000 B.C.
	Azilian	Bone harpoons, painted pebbles	
	Tardenoisian	Small flints	
	Maglemosian	Stone and bone tools	
	Kitchen middens	Stone and bone tools, pottery	
Recent Neolithic	Campignian	Pottery, millstones	6000 B.C.
	Lake dwellers	Polished flints, fossil seeds, pottery, weaving, basketry, domesticated animals	

The change from paleolithic to neolithic culture in Europe was gradual. The climate was cold because the fourth glacier still was slowly

retreating. Capsian culture in Africa and Spain and Azilian and Tardenoisian in France show no advance over the previous Magdalenian culture of the Paleolithic Age. Their artifacts distinctly reveal less clever workmanship. The Maglemosian culture of Denmark is that of a hunting people who lived in a cold swampy region. The kitchen-midden folk of Denmark lived at about the same time on the beach by the sea, where the huge shell mounds left by them may still be seen. Among the numerous artifacts discovered in them are fragments of pottery, a sure sign of progress because the making of earthen vessels

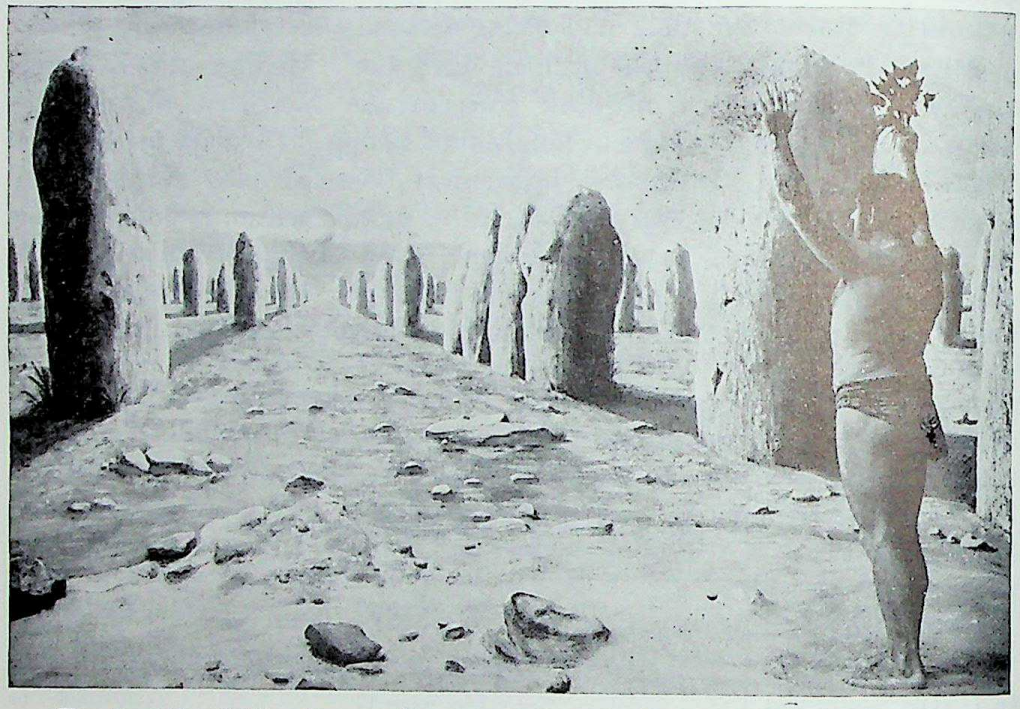


FIG. 9.—Megalithic culture. (*Courtesy of the Field Museum of Natural History.*)

(for storing grain, wine, and milk) implies the practice of agriculture and cattle raising. Henceforth, progress was fairly rapid, as revealed by the artifacts of the Campignian culture, among which millstones have been found, proving that agriculture was practiced. Further evidence that agriculture, fruit raising, and even cattle raising were becoming important is provided by the remains of the lake villages built in Switzerland. Vast quantities of discarded objects found in the mud deposited at the foot of the piles which supported the houses show that, although the lake dwellers lived on the water for security, they cultivated the land for sustenance.

Toward the close of the Neolithic Age in Europe appeared a culture called "megalithic," from the megaliths, or great stone monuments, still standing in northern Africa, Asia Minor, the Black Sea region, and

western and northern Europe. There are several types. Dolmens are burial chambers with sides formed by huge boulders and covered by larger rocks, the whole covered with a mound of earth, which made them look like old-fashioned beehives. Menhirs are tall slabs of stone set firmly in the earth, some being more than seventy feet tall. Archaeologists have not yet discovered their real significance. Cromlechs are groups of stones arranged in rows, circles, or mystic patterns, probably for purposes of worship. Those at Carnac in Brittany and at Stonehenge in England are the most remarkable and best known. They remain the most impressive monuments of the late Neolithic Age and the Bronze Age, the latter dating from about 2000 B.C. All these megalithic monu-

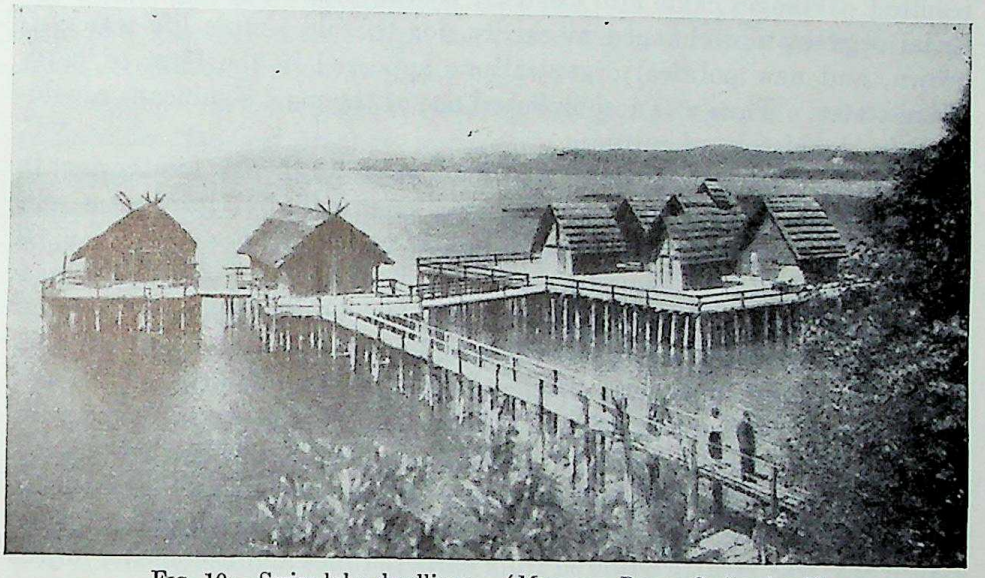


FIG. 10.—Swiss lake dwellings. (*Museum, Berne, Switzerland.*)

ments have been the subject of a great deal of speculation; but archaeologists have not been able to piece together enough information to give us an accurate picture of the life, language, and religion of the people who built them.

RISE OF AGRICULTURE. Of the new cultural habits developed by neolithic man, we must first consider those associated with agriculture. No one knows when, where, or by whom the first steps were taken in the domestication of grains, but it is likely that the practice of raising them passed into Europe from western Asia. Paleolithic man was in the habit of eating seeds as well as roots, berries, and meat. Fossil remains of these plants have been found in many places, especially in the debris of the lake dwellings of Switzerland.

DOMESTICATION OF ANIMALS. Along with the development of agriculture went the domestication of animals. The dog apparently

was the first animal to be domesticated, but there is much uncertainty about this point. The first steps in taming wild animals and fowl are obscure, but the habit of keeping them appears to have begun in Asia. The cow, sheep, goat, pig, goose, duck, pigeon, and bee—all were domesticated during Neolithic times. Like the grains and fruits, these animals greatly increased the food supply. Henceforth man became less and less dependent upon hunting for his livelihood.

Far-reaching social consequences resulted from the practice of agriculture and the domestication of animals. No longer dependent upon wild animals for their food supply, hunters tended to become sedentary; habits of living were modified, and a tremendous increase in population resulted. Villages came into existence by the close of the Neolithic Age; social organization changed markedly, for the old simple life was outgrown, and new political organizations appeared in the form of petty tribal states. Thus was accomplished one of the most significant revolutions in the history of culture.

Rise of Commerce. So long as man was a wandering hunter ever in search of food, population was relatively small and each group was self-sufficient. There was little need to import articles from a distance. Of course there had been some commerce, some barter, in Paleolithic times. In Neolithic times, man still needed flint, which became a commercial article of ever-increasing importance. The superior beeswax flints from Grand-Pressigny in central France have been found all over France, Italy, Switzerland, and Belgium. Flint mines have been discovered, and in them neolithic picks of deer's horn provided with flint points. There also was some trade in European jade to be used in making amulets. Amber, the fossil gum of resin-bearing trees produced on the shores of the Baltic Sea, was greatly admired from earliest times and became an object of trade during the closing centuries of the Neolithic Age.

Neolithic Inventions, Arts, and Medical Practice. Several new inventions proved most important in the expanding economic life of neolithic man. The first of these were boats made from the trunks of trees hollowed out by means of stone hatchets. Boats may have been used for trading or other purposes during Paleolithic times, but they became increasingly important at the close of the Neolithic Age.

The second invention was the wheel. At first wheels were fashioned, it appears, with hubs, spokes, and fellies. Wheels made possible the conveying of heavy burdens over long distances in wagons drawn by oxen. Surprising adaptations were made, such as the potter's wheel, which became an extremely useful tool shortly after the Neolithic Age had passed. Later, in historical times, the wheel was used in windmills, hoisting machines, clocks, and watches. The wheel, in various forms, is the motivating power of our machine age. Closely associated with it

came that other revolutionary invention, the plow. In spite of its crudeness, it was a great improvement on the stone hoe with which the women tilled, or rather scratched, the soil.

Other arts related to agriculture and cattle raising now came into existence. The women learned to make curds, cheese, and butter from the milk of cows and goats. Stones for grinding grain date from early Neolithic times, and bread was baked in heaps of coals. Carbonized loaves have been found in the mud under Swiss lake dwellings. Need for storage developed skill in basketry and pottery. Baking vessels were made from baskets or gourds coated with mud and baked. Designs were added, the most common being the beaded-string ornament, the chevron, the whorl, and other geometrical patterns. It was possible to produce true and graceful shapes with the potter's wheel, and vessels assumed some attributes of beauty.

Surgery now made its first rude beginnings. Magic, the chief feature of primitive medical practice, apparently gave rise to the curious custom of trepanation, that is, perforating the skull. This probably was intended to release the evil spirit supposed to have caused the malady. Many skulls of American Indians have been found with the scars of such an operation.

Neolithic Religion. Equally profound were changes in religion during Neolithic times. Old forms such as magic, animism, and the cult of a supreme being continued, but with much modification. As neolithic man in western Europe became more and more dependent upon agriculture and interested in his crops, he wondered at the changes of winter and summer, of nature dormant and reviving, and apparently began to look upon the earth as a great mother goddess. Raising crops and flocks was man's chief business; and the reproductive aspect of nature assumed increasing interest and importance. Beside the Earth Mother goddess there appeared her youthful divine lover, the father of vegetation, which nature produced on the return of the sun in springtime. Summer was the happy time of their mating. During autumn the lover faded away, to pass into nether realms during the bleak winter months,when the Earth Mother wandered in grief looking for him until reunited with him on the return of spring. The Earth Mother was the goddess of field, harvest, and domestic and wild animals. In many places she was the mother of the neolithic agricultural and cattle-raising culture just described. Numerous myth forms of the Earth Mother goddess and her divine consort appeared in different guises, as Isis and Osiris in Egypt, Ishtar and Tammuz in Sumer, and Cybele and Attis in Anatolia, deeply influencing generations of religious thinking.

From the foregoing it is clear that paleolithic man and neolithic man made significant contributions to culture. Though knowledge of our

ancestors in that dim and far-distant past is all too scanty and derived almost entirely from archaeology, their achievements form the substantial foundation on which the structure of later civilization was to be erected. Their lasting value is shown by the fact that most men still make a living from cattle raising and agriculture and that without the use of fire and the wheel our industrial system would be impossible. The more we reflect on these contributions, the more we realize that the cultural triumphs of the Paleolithic and Neolithic ages in a very real sense belong also to us. To ignore them would be to make a proper understanding of the following ages impossible.

FOR FURTHER READING

Boas, Franz: *The Mind of Primitive Man*, rev. ed.
Burkitt, M. C.: *Prehistory*
Childe, V. G.: *Man Makes Himself*
Cleland, H. F.: *Our Prehistoric Ancestors*
Cole, F. C.: *The Long Road from Savagery to Civilization*
Dawson, Christopher: *The Age of the Gods*
Dixon, R. B.: *The Building of Cultures*
Forde, C. D.: *Habitat, Economy, and Society*
———: *Primitive Religion*
———: *Primitive Society*
MacCurdy, G. G. (ed.): *Early Man as Depicted by Leading Authorities*
———: *Human Origins*
Malinowski, Bronislaw: *Myth in Primitive Religion*
Murdock, G. P.: *Our Primitive Contemporaries*
Osborn, H. F.: *Men of the Old Stone Age*
Peake, H. J.: *Early Steps in Human Progress*
——— and H. J. Fleure: *The Corridors of Time*, Vols. II–IV
Quennell, Marjorie, and C. H. B. Quennell: *Everyday Life in the Old Stone Age*
——— and ———: *Everyday Life in the New Stone, Bronze, and Early Iron Ages*
Radin, Paul: *Primitive Man as Philosopher*

Chapter III

THRESHOLD OF HISTORY: BRONZE AND EARLY IRON AGES

It is recognized throughout the English-speaking world that western civilization is but the culmination of a tradition of inventions and discoveries that is ultimately rooted in the ancient East.—V. G. Childe

After neolithic man had progressed in agriculture, cattle raising, and various forms of craftsmanship associated with such activities, he began to use metals in the manufacture of implements and ornaments. No sharp division marking this innovation can be assumed; in fact, just as the culture of the Paleolithic Age passed gradually into that of the Neolithic Age, so likewise did neolithic culture pass into that of the succeeding Bronze Age, which made ever greater use of metals. Nevertheless, stone implements remained in constant use throughout the Bronze Age and even into the Iron Age, which came next. Stone is an excellent material for tools; in some parts of Europe, men until recent years continued to fashion heavy hammers out of that material.

Significance of Metals: Gold and Silver. The discovery of metals is most significant in the history of culture. Curiously, however, the first metals to be employed were not the ones most important in man's efforts to produce a culture. Gold was the common metal found in its pure state in richly laden sands of the rivers of Asia and Europe. Placer mining developed, and quantities of this gleaming metal were produced as early as 6000 B.C. in the Tigris-Euphrates Valley. The men of the Copper and Bronze ages possessed an extraordinary hoard of it. Never since that time has man had relatively so much of this metal, for it was easy to extract. Perhaps its great abundance at this early date was the cause of the later tradition of a golden age, a favorite theme of Greek and Roman poets. Homer described in great detail the splendid ornaments of gold worn by his heroes of the Iliad.

Silver likewise was produced in large quantities but had to be mined, being rarely extracted by placer methods. Like gold, it was in demand for jewels and fine furnishings. Both metals later were used as money; and because there was a considerable supply, their use greatly stimulated commerce.

The Copper Age. Copper was more useful than gold or silver in the development of a culture. When, where, and by whom it first was used

no one can tell. Deposits in Spain and Cyprus were worked at an early date. It was mined in the Sinai Peninsula in the fourth millennium B.C. The Armenian uplands north and east of the headwaters of the Tigris also produced this metal in some abundance.

Copper may have been discovered when someone built a camp hearth with copper-bearing stones and the fire smelted the ore. It was frequently found in a practically pure state ready for immediate use. Its malleability made it a particularly desirable metal. When associated with other ores, it was reduced in furnaces, simple holes in the ground and, later, stone structures above the ground. At first it was the custom to hammer the new metal into tools shaped like the stone implements of the Neolithic Age. For this reason, archaeologists have called the earliest stages of the Copper Age the Chalcolithic or "Copper-Stone" Age.

THE BRONZE AGE. Following the Copper Age came the Bronze Age, which began when metalworkers mixed copper with tin. Tin was not plentiful; it must therefore have been some time before workmen discovered that mixing it with copper in the proportion of 1 to 9 produced a harder and more useful implement. The first tin came from Persia and Khurasan; and because this metal is found there in close proximity to native copper, it is possible that the first bronze was produced in Persia. Later, tin was brought from Spain and Cornwall in England, which finally became its most important source.

A remarkable Bronze Age culture developed in the Tigris-Euphrates and Nile valleys, the lands between them, and the adjacent parts to the north and east, including the Indus Valley of India. It soon spread to other lands north and west; and on the island of Crete we find a Bronze Age culture flourishing before 3000 B.C. Closely related to it was the bronze culture of Asia Minor, particularly that of Troy, a city near the Dardanelles famous as the scene of events described in Homer's *Iliad*. Strategically situated as a commercial center, Troy played an active part in the distribution of bronze articles as well as in their manufacture.

The early trade routes spread from Asia northward into Danubian lands and thence to central Europe, particularly Bohemia. By diffusion, therefore, Bronze Age culture appeared in the valley of the Danube about 2000 B.C., taking the name Aunjetitz from a cemetery near Prague. A vigorous peasantry, practicing the characteristic arts of neolithic culture such as farming and cattle raising on a small scale, flourished in these parts and welcomed the improved tools.

Bronze culture next passed through the defiles of the Alps into the Po Valley, where it is known as the "terramara" culture. The people of this culture built villages in geometrical patterns on piles, like the villages of the Swiss lake dwellers, to whom they are believed to have been related. They also dug moats around their villages and filled them with

water for the sake of protection. So bronze culture passed to other parts of Europe, reaching such northern lands as Scandinavia as late as 1600 B.C.

During the earlier part of the Bronze Age the traditional stone implements were, as we have noted, more commonly used than those made of copper. Bone also was employed. Pottery was a most important product, for enormous vessels were needed to store grain and wine and to hold milk for making cheese. Gradually, however, bronze was employed more and more in the manufacture of tools and other objects. These improved in form and decoration, bronze swords, poniards, shields, knives, saws, sickles, brooches, bracelets, pins, axes, trumpets, and vases finally revealing the greatest artistry. Numerous examples have been found in many parts of western Europe, those of Denmark being especially fine. A vast hoard of 14,800 objects was uncovered at Bologna, a city of the Po Valley, when workmen were excavating for a sewer. These articles date from the latest phase of Bronze Age culture in Italy, the famous Terramara Period.

Commerce also flourished during the Bronze Age to a much greater degree than in the preceding Neolithic Age. Being found in few places, copper had to be imported by merchants of the densely settled areas of Egypt or Mesopotamia from distant Khurasan, Spain, and Ireland. Tin, even more scarce, was brought from Spain and Cornwall. Through this commercial activity, Mediterranean bronze culture steadily expanded, finally embracing all northern Europe.

Other articles of commerce, gold, for example, came from Ireland and Spain. Amber, increasingly an object of trade, was the chief item of value possessed by the peoples of Baltic lands with which they could purchase the coveted bronze from the south. Sought as a material for necklaces, it was believed to possess magical healing powers. Tombs of early Greek warriors have yielded splendid examples of amber jewelry. To facilitate such trade, rings and bars of bronze were used as money. This marks a commercial stage more advanced than that of barter—when goods were exchanged for goods and long before money was officially stamped as guarantee of purity and fineness.

Great changes in transportation followed the application of the wheel to the carrying of heavy loads over long distances. The first wagons constructed for this purpose were drawn by oxen. New roads were opened, and greater prosperity ensued. Where seas had to be crossed, larger boats were constructed and sails were invented. Thus commercial activity constantly increased, and a great number of trade routes came into existence—the very routes that became important in Europe during the Middle Ages and that even today are used by the international railways.

The religious ideas of the Neolithic Age continued throughout the Bronze Age. As we have seen, these were associated with the baffling mystery of recurring spring and summer and the renewal of crops, thus giving rise to the story of the Earth Mother and her divine lover. It is understandable that the people of the Bronze Age, which became more and more agricultural as it abandoned the small-scale horticulture of later Neolithic times, should ponder deeply on the productivity of nature. To them the sun, creator of light and heat and producer of crops, seemed the highest principle in creation. Worship of the sun therefore became common, even during the last centuries of the Neolithic Age. This was in reality a great religious revolution, for it displaced or modified the beliefs that had persisted from earlier hunting times. Cults surviving in the Bronze Age in Egypt and associated with magic and animism gave way to the worship of the sun, creator of light and highest agent of right, which combated darkness, hunger, cold, and other forces hostile to life and civilization.

Worship of the sun also was widely diffused throughout Europe, northern Africa, and western Asia. Its obvious symbol was the disk, examples of which archaeologists have found in many places. The most remarkable of these is one mounted on a six-wheeled chariot found in a peat bog in Denmark. The large convex disk covered with gold leaf is drawn by a bronze horse provided with eyes of resin. The reverence with which the horse was held is shown by the numerous horses' heads carved on the stone artifacts of the late Neolithic and Bronze ages in northern Europe. Bronze horses have also been found repeatedly. This probably means that the horse was regarded as sacred and inspired the myth that the sun in its daily course from east to west was drawn by a fiery steed across the sky. At night the sun passed through the nether regions, guided by a swan. The sun chariot also became a popular symbol, especially in Scandinavia, where winter nights were long and days correspondingly short. Scandinavian objects of bronze have conventionalized forms of the sun chariot engraved upon them, and rock carvings portray barks with prows curved like a swan's neck, carrying the sun disk.

No doubt there were special local beliefs, most of which were of ancient origin. Magic flourished, and superstition was rife. For a while, Bronze Age folk buried their dead, with knees bent; but gradually the practice of cremation became popular. Perhaps this was because fire, closely associated with the sun, the bestower of all blessings, was regarded as beneficent. The crude female images with exaggerated sexual aspects common in Neolithic times finally disappeared. Sun worship did not encourage such ideas, probably because the sun, the source of light and life, was not closely associated with ideas of sex.

Dawn of the Historical Age. Man thus had made remarkable progress by the close of the Bronze Age. He possessed many crafts and a number of basic inventions, especially the wheel. He tilled the soil, raised crops, and so enjoyed a dependable supply of food. This cultural equipment was further increased by the domestication of animals, which provided milk, cheese, and meat. Commerce and trade were growing steadily. Population was increasing rapidly in Egypt, Mesopotamia, India, and China. Consequently, communities became too complex to be governed by the simple laws of tribes. A veritable revolution was in the making, a revolution that brought mankind to the dawn of history.

These changes are marked by the invention of writing and the formation of states ruled by powerful kings. The moment people began to record their thoughts in writing, we have valuable information about them and the historian is no longer dependent upon knowledge extracted from archaeological objects. The invention of writing therefore is a revolutionary event in the history of civilization. It marks the dawn of the historical age.

For ages, man had exchanged ideas by means of drawings. In the Neolithic Age, men painted designs on pebbles, and archaeologists believe that these may have been used in conveying thought. Some Indian groups of North America and natives of the South Sea Islands used similar markings.

Genuine writing developed first, it appears, in Egypt. Three distinct stages are to be noted, as follows: (1) The first is picture writing pure and simple; that is, pictographs drawn with more or less care so that some appropriate action may be read into them. Much like the picture writing on skins developed by the Sioux Indians of the North American plains, this had the obvious disadvantage that the drawings could be interpreted in various ways. (2) The next step marks a great advance; the drawn forms became fixed, being copied repeatedly with practically no variation so that they could not easily be mistaken. Further, they became phonetic; that is, each sign stood for a definite group of sounds; and some six hundred signs in all were developed. (3) The final stage, completed before 3500 B.C., marks the formation of a genuine alphabet of twenty-four figures, each representing a sound. It became the custom to break up a word into its component sounds and to represent each sound by means of a sign or, as we should say, a letter. Such characters are called "hieroglyphic" from the fact that in the beginning at least they were employed exclusively by priests.

Thus evolved one of man's greatest achievements—genuine writing capable of conveying thought. A similar phenomenon appeared in Mesopotamia where cuneiform (that is, wedge-shaped) writing developed.

Having now traced the growth of human culture to the dawn of history, let us survey the geographical stage set for the first act in the historical drama. This stage, comprising the vast area of northern Africa and southern and eastern Asia from the Atlantic Ocean to the Yellow Sea, is cut up by a series of bleak deserts, the Sahara, the Arabian, and the wastes of Baluchistan. Several rivers course through it, the Nile, the Tigris, the Euphrates, the Indus, the Ganges, and the Brahmaputra. Although for the most part arid today, this region presented a different aspect at the beginning of Mousterian times in the Paleolithic Age. The last glacial mass was retreating from the Alps until finally it became limited to northern Scandinavia. In late Paleolithic times, when the glaciers reached over much of central Europe, the rainy belt included the Mediterranean lands, Africa, and the Arabian Peninsula. An abundance of vegetation covered the Sahara and the Arabian Desert, supporting abundant animal life for the hunting peoples of late Paleolithic times.

Capsian Culture. As the centuries wore on and the rainy belt shifted northward, the regions later marked by the Sahara and the Arabian Desert became drier and drier until finally they were desolate wastes of sand. But the vanished population left artifacts that have enabled archaeologists to piece together an account of their culture. Like the hunters of the Aurignacian and Magdalenian periods of Europe, they depicted on the rocks of caves and other places the animals which they sought for food or against which they had to defend themselves. Thus we have pictures from that time of bears, sheep, deer, gazelles, oxen, buffaloes, and rhinoceroses as well as lions, panthers, jackals, and hyenas. Flint objects like those of the paleolithic Mousterian culture in Europe have been found throughout northern Africa. Others belonging to Neolithic times reveal a close kinship to Aurignacian flint tools. These have been described as "Capsian," so called from objects found at Capsa (now Gafsa) in ancient Tunis (Tunisia). Although much uncertainty exists about the chronology of these artifacts, they indicate that the Sahara region had a moist climate during the closing Paleolithic Age and early Neolithic Age and supported a definite culture.

Nile, Tigris-Euphrates, and Indus Valleys in the Neolithic Age. With Neolithic times came agriculture and domesticated animals. Life thronged in the fertile valleys of the Nile, Tigris, Euphrates, and Indus rivers and the Hwang Ho. Large villages came into existence, thriving on the new food-producing economy. Hence, at the opening of the Bronze Age these valleys became seats of an advanced culture in which many new arts were created and passed on by diffusion and imitation to less favored regions.

Bronze Age Culture in the Indus Valley. Before discussing the culture of Egypt and Mesopotamia in the next chapters, we shall here

briefly describe the development of culture in India, China, and Japan. Until recently, scholars knew practically nothing about the early culture of India. But sufficient archaeological discoveries have been made to warrant the belief that paleolithic culture flourished in parts of India and that neolithic culture developed in striking fashion in the Indus, Ganges, and Brahmaputra valleys. Population grew enormously, and city life came into existence at the opening of the Bronze Age. Ruins at Mohenjo-daro, a group of mounds a mile square, have recently been investigated superficially and promise rich revelations. The archaeological remains of another equally ancient site, Harappa, about four hundred miles to the northeast, show that its people practiced agriculture and kept domesticated zebus, buffaloes, sheep, fowl, elephants, and swine.

Furthermore, it is evident that there was commerce along the Indus, the coast of Baluchistan and Persia, and inland to Kashmir. The people worked lead, copper, and gold and mixed copper with tin to produce bronze. Their potters used the potter's wheel and made excellent ware. The artifacts found at Harappa and Mohenjo-daro show that by 3000 B.C. the Indus Valley was filled with an industrious population evidently comprising many racial elements, including the mongoloid.

The inhabitants of Harappa were an able people. Their town was well laid out, its unpaved streets crossing at right angles. The houses were constructed of burnt brick set in mortar. An extraordinary feature is the inclusion of bathrooms in many of the houses. There was also an elaborate system of drainage with pipes made of pottery connecting bathrooms with street gutters.

The inhabitants displayed great artistry in the manufacture of soapstone seals or amulets bearing beautifully carved figures of such animals as the tiger, elephant, bull, rhinoceros, antelope, buffalo, and crocodile. The amulets also bear pictographic inscriptions, which, however, have not yet been deciphered. The culture of Harappa and Mohenjo-daro is probably as ancient as that of Mesopotamia, suggesting to archaeologists that the cultures of the Indus and Tigris-Euphrates valleys were to some extent dependent upon each other. It is upon this cultural foundation that the later brilliant civilization of India was erected.

Rise of Chinese Culture: Paleolithic Age. There also was a striking cultural advance during these times in the lands that have since constituted China. Until recently, nothing was known about China's history before the second millennium B.C. For centuries, historians have stated that China's ancient civilization dated back hundreds of thousands of years, but these assertions were devoid of foundation. No archaeological proof existed of any human life in Paleolithic times until the discovery in 1929 of human skeletal remains near Peiping, (formerly Peking) known as Peking man. From the artifacts associated with the

fossilized remains of Peking man, we infer that he was a hunter who knew how to make use of fire. Unfortunately, few other discoveries of paleolithic man in Chinese soil have been found, but we may confidently hold that ancient China was peopled with men who possessed the cultural habits common to Paleolithic times.

Neolithic Age in China. That China was inhabited by an agricultural population during Neolithic times may be assumed in spite of the absence of archaeological evidence. For we know that when the Bronze Age opened there was a numerous population in all the valleys of China. Rice was grown in the muddy flats of the Si and the Yangtze, and the domesticated water buffalo played an important part in the cultural life of the people. Especially in the valleys of the Hwang Ho, or Yellow River, and its tributary, the Wei, significant progress was made.

Thanks to the excavators of the past twenty years, numerous evidences of an advanced culture dating from late Neolithic times have been unearthed. Smooth or polished stone axes and pellet bows that shot stone or earthen balls were commonly used. Millet seed was the usual food; the pig and the dog were the only domesticated animals. In the small arts, baskets, matting, and cloth were produced. Pottery was made in immense quantities, some plain and some painted and decorated with geometrical designs. Particularly interesting are the *li* tripods, earthen jars supported by hollow legs, peculiar to the region. This late neolithic culture extended over the Hwang Ho and Wei valleys, Manchuria, and westward as far as Dungaria and Sinkiang.

Bronze Age in China: Shang Dynasty. Chinese Bronze Age culture dates from about 1500 B.C. and includes the great Shang Dynasty (about 1765 to 1123 B.C.), the capital of which was Anyang in the province of Honan. There the technique of bronze manufacture attained the greatest perfection as is shown by the tripod libation vessels produced in great quantities. Oracle bones have been found, bearing questions the ancient Chinese asked of their ancestors and their gods. The inscriptions, ten to sixty words in length, were cut in rows of geometrical figures, forming a highly developed form of pictographic writing, forerunner of the present-day Chinese characters.

Early Civilization in Japan. The beginnings of civilization in Japan are more obscure than those in China, although there is some proof that men inhabited the Japanese islands in Paleolithic times. However, archaeologists have found sufficient evidence to enable historians to state that a neolithic culture flourished in Japan until about 1000 B.C., followed by a rich Bronze Age culture. Armor, helmets, and horse trappings of bronze have been discovered in the tombs, indicating the possibility that cultural influences were introduced from China shortly after the Shang Dynasty. Japanese culture continued to lag behind that

of the Hwang Ho Valley, however, and the islanders never developed an independent system of pictographic writing.

THE IRON AGE. The culture of a new era—the Iron Age—spread, it appears, from the Tigris-Euphrates Valley to points east, west, and north. It is remarkable that early man should have been so slow in adopting iron, for its discovery exercised an even greater revolutionary influence than that exerted by copper or bronze. Iron smelts at 700 to 800°C., but copper smelts at 1100°C. Where iron was first found or who discovered the way to work it is not known; it may have been found first in meteorites. Beads of hammered iron strung with beads of gold have been found in Egyptian tombs of about 4000 B.C. The first industrial employment of iron, however, occurred in the Tigris-Euphrates Valley, where extensive mining began probably as early as 1500 B.C., in the mountains east of Nineveh. The Hittites also produced great quantities of iron from the rich veins in the mountains of northern Asia Minor along the Black Sea. Much of this metal was exported to western Asia, Egypt, and the Mediterranean world. Being cheap and plentiful as compared with bronze, iron became the favorite metal for tools hitherto made from stone, copper, or bronze and for the construction of war chariots and other military equipment. Squadrons of war chariots with iron swords attached to their wheels and drawn by horses were effectively used in war. So iron gradually supplanted bronze; but only very slowly was its full importance realized.

Archaeologists and anthropologists have long been in the habit of dividing the early history of culture into five ages—Paleolithic, Neolithic, Copper, Bronze, and Iron—but none of these cultural ages is clearly marked off. In fact, as we have pointed out, paleolithic culture may be found even today in backward and remote places, and many of our own cultural traits are derived from the Paleolithic, Neolithic, Copper, and Bronze ages. Strictly speaking, we still are in the Iron Age. The volume of iron production is increasing annually at a prodigious rate as new uses are found and better alloys are developed. Iron is rapidly supplanting wood as a building material and already has driven wooden ships from the seas. But the use of such terms as the "Iron Age," based chiefly upon archaeological artifacts, inadequately describes the course of civilization and must be abandoned as soon as facts are preserved in written records, beginning with the Bronze Age. Henceforth, the story of the growth of culture must be divided into shorter periods, each possessing characteristic features, as, for example, the Greek, Roman, Medieval, Chinese, and Indian periods, the Renaissance, the age of Louis XIV, and the Age of Liberalism.

Gradually the use of iron spread northward, eastward, and westward into Europe, Asia, and Africa and supplanted bronze. Like ripples on a

pond, cultural influences, including the use of iron, radiated from the Tigris-Euphrates Valley and reached the most distant haunts of man. The Iron Age began in Crete about 1200 B.C. Soon afterward, it appeared on the Greek mainland, where it has been given the name of Dipylon culture. The artifacts, mostly ceramic, are decorated with such geometric designs as triangles, swastika crosses, and wheel patterns, but the artists also used representations of animals such as the horse and goat, birds, and even man. This Dipylon culture provides as noteworthy examples of Iron Age culture as the objects found in northern Italy, examples of what archaeologists have called Villanovan culture. An immense number of objects made from bronze and iron have been found, eloquent of the improving skill and growing artistic appreciation of the people who made them about 1000 B.C.

Danube Valley: Hallstatt Culture. North of the Alps, in the valley of the Danube, iron culture began as early as 900 B.C. and is referred to as the Hallstatt culture. People living in the Danube River Valley, who were responsible for this culture, carried on an active trade in amber from the shores of the Baltic and in copper, iron, and tin needed in the manufacture of bronze articles. This, the earliest iron culture in central Europe, extended over what is now France, Spain, and Britain as well as the valleys of the Rhine and Danube and lands farther eastward. Vast quantities of iron and bronze artifacts have been found in widely separated regions. Among the objects are swords, daggers, brooches, vessels of all sorts, and tools, often decorated with geometrical designs supplemented by animal figures.

La Tène Culture. An advanced form of iron culture, named La Tène after the shallows at the northeast end of the Lake of Neuchâtel, Switzerland, spread throughout the same region as the Hallstatt culture. Bronze was still used, but less plentifully than iron, from about 400 B.C. down to the Christian Era. By the time of the first Roman conquests, iron had supplanted bronze; and the immense number of objects turned up by the archaeologists illustrates the cultural life of Europe at that time. The art forms of La Tène culture included geometrical patterns of all kinds, the swastika design, and animal and human figures. The finest examples of this culture are to be found among the remains of the Celtic inhabitants of what is now France of the time of the conquests by Julius Caesar (55 B.C. and after).

Iron Age in Asia. The Iron Age, which thus spread over western Europe after 1000 B.C., also moved eastward over the plains of southern Russia, the steppes of Asia, and the broad agricultural areas of northern China. Not until about 500 B.C. did iron appear in China in the regions along the Hwang Ho. There, too, it gradually supplanted the use of bronze. Much archaeological work has been done in Siberia during

recent years at Minusinsk, a town on the shores of Lake Baikal. There a prolific Bronze Age culture was succeeded by an equally energetic manufacture of iron objects, about 200 B.C. Iron culture appeared in Japan at about the same date.

Thus gradually, after its first beginnings about 1500 B.C. in the Tigris-Euphrates Valley, the use of iron spread over all the lands to north, east, and west. Iron became a most important factor in the diffusion of the culture of the Tigris-Euphrates and the Nile valleys. The principal agents in the spread of iron culture into the lands washed by the Mediterranean, as we shall learn, were the Semitic Phoenicians, the chief trading people of the West from about 2000 B.C.

With this we close our account of the long stretch of the silent centuries of man's early striving. No dates of great events, no vivid personalities, no tales of heroic deeds, and no triumphs of war or government have come to us from those distant times—by far the longest in man's history. Yet, without the achievements of these nameless peoples, the foundations of our own civilization could not have been laid as they were laid. Hence the heritage of the Paleolithic, Neolithic, and Bronze ages is of the first importance to us.

FOR FURTHER READING

ANDERSON, J. G.: *Children of the Yellow Earth*
CHILDE, V. G.: *New Light on the Most Ancient East*
CLELAND, H. F.: *Our Prehistoric Ancestors*, Chap. VII
CREEL, H. G.: *Studies in Early Chinese Culture*
———: *The Birth of China*
GRANET, MARCEL: *Chinese Civilization*
MYRES, J. L.: *The Dawn of History*
NAVARRO, J. M. DE: "Prehistoric Routes between Northern Europe and Italy Defined by the Amber Trade," *Geographical Journal*, December, 1925
PEAKE, H. J.: *Early Steps in Human Progress*
———: *The Bronze Age and the Celtic World*
——— and H. J. FLEURE: *The Corridors of Time*, Vols. VI and VII
PEET, THOMAS: *The Stone and Bronze Ages in Italy and Sicily*
QUENNELL, MARJORIE, and C. H. B. QUENNELL: *Everyday Life in the New Stone, Bronze, and Early Iron Ages*
RAWLINSON, H. G.: *India: A Short Cultural History*
RENARD, G. F.: *Life and Work in Prehistoric Times*
RICKARD, T. A.: *Man and Metals*, Vol. I
TORII, RYUZO: *Ancient Japan in the Light of Anthropology*

Chapter IV

CIVILIZATION OF EGYPT

Egypt is the gift of the Nile, and the Nile is a river without parallel on this earth.—J. L. Myres

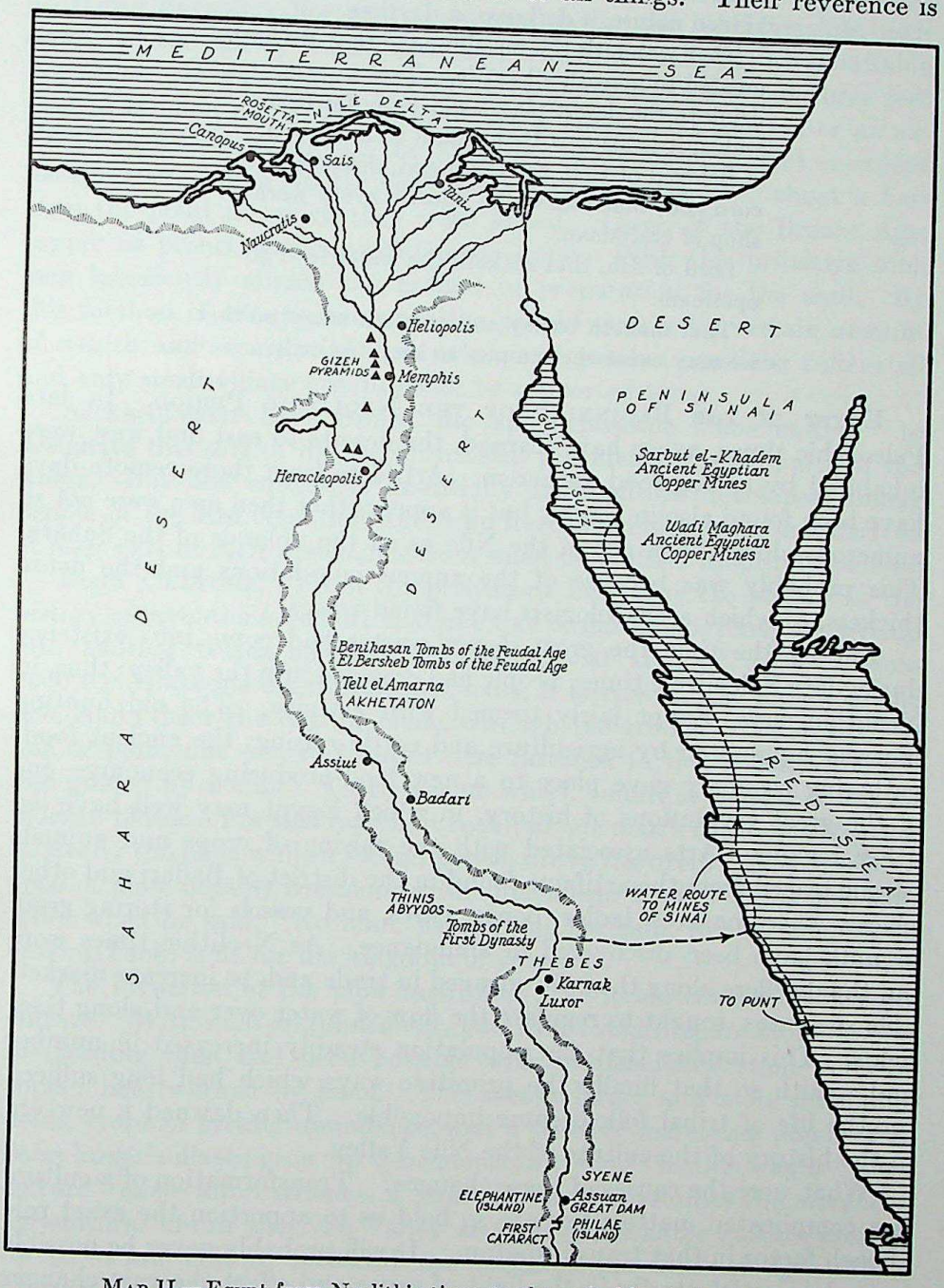
IN ALL the early story of man, no land is more romantic than Egypt, more generous in her records of cultural development. Many regions passed from one early culture to another without leaving any considerable records of momentous changes. But in Egypt early man has left us a continuously unfolding record of his culture from the Neolithic times of 5000 B.C. Small wonder that Egypt has continued to lure archaeologists and historians when such rich cultural lore has been both promised and revealed.

First let us study the geographic peculiarities of this land, for they exercised a compelling influence upon its inhabitants. Egypt is the valley of the Nile River, the narrow strip of fertile alluvial soil between the brown and burning desert uplands on either side. At some places this valley is but 10 miles wide, at others as much as 20. Its northern extremity, forming the delta and called Lower Egypt, is a broad plain. Its southern portion, from the First Cataract at Aswan, the ancient Syene, to the delta, is known as Upper Egypt. The length of the two parts is about five hundred miles.

The vast deserts on either side effectively insulated Egypt from contacts east and west. The south was vulnerable to Nubian and Ethiopian influences; in the northeast the land was open to strangers from Mediterranean lands and Arabia. Egypt, somewhat isolated from the rest of the world, was free to develop her own civilization without much external interference except at certain important crises in her history.

The Nile River. Egypt owes its immense fertility to the annual inundation of the Nile, which, fed by the lakes of Abyssinia in central Africa, overflows its banks in June and returns to its channel in December. A deposit of slimy silt is thus left, which after many centuries has produced a soil of outstanding fertility. The total habitable area of only about ten thousand square miles probably supported at the close of its independence in 525 B.C. at least seven million people. Egypt, therefore, was by far the most populous land in antiquity, exceedingly rich, and a leader in all phases of culture.

It was natural that the Egyptians regarded the Nile as a god, created by the god Ra, maker and sustainer of all things. Their reverence is



MAP II.—Egypt from Neolithic times to the end of her independence.

well expressed by a hymn, the *Adoration of the Nile*, dating from very early days and composed, it appears, for an inundation festival.

> Praise to thee, O Nile, that issueth forth from the earth and cometh to nourish Egypt. Of hidden nature, a darkness in daytime. . . .
>
> That watereth the meadows, he that Ra hath created to nourish all cattle. That giveth drink to the desert places which are far from water; it is his dew that falleth from heaven.
>
> Beloved of Geb, the earth god, director of the corn god; that maketh to flourish every workshop of craftsman.
>
> Lord of fish, that maketh the water fowl go upstream.
>
> That maketh barley and createth wheat so that we may cause the temples to keep festivals. . . .[1]

Egypt in the Beginning of the Neolithic Period. In late Paleolithic times, as we have learned, the deserts to east and west were inhabited by roving food gatherers. Artifacts from those remote days have been found also in Egypt; but it appears that then men were not so numerous along the banks of the Nile as on the uplands of the Sahara. This probably was because of the annual inundations and the dense thickets, of which archaeologists have found traces.

But by the time the great desert wastes had come into existence during late Paleolithic times, people had crowded into the valley; thus, in Neolithic days, Egypt fairly teemed with activity. The old hunting life was supplanted by agriculture and cattle raising; the ancient food-gathering economy gave place to a new food-producing economy—one of the great revolutions of history, in which Egypt may well have led other regions. Arts associated with the raising of crops and animals can be traced from the artifacts found in the district of Badari and other places, where baskets, ladles, bowls, vases, and vessels for storing grain or milk have been discovered in abundance. As Neolithic times wore on, the dwellers along the Nile engaged in trade and, to increase marketable surpluses, sought to regulate the flow of water over and along their fields. This implies that the population steadily increased in number and wealth so that finally the primitive ways which had long sufficed for the life of tribal folk became impossible. Then dawned a new era in the history of the culture of the Nile Valley.

What were the causes of these changes? Transformation of a culture is a complicated matter; few are so bold as to apportion the exact role of each factor in that transformation. It will probably never be possible to explain satisfactorily in the light of cause and effect the vast changes

[1] Erman, A., *The Literature of the Ancient Egyptians*, p. 146, Methuen & Co., Ltd., London.

that have come in man's way of doing and thinking ever since he began to create culture.

HOE CULTURE. For many centuries during the Neolithic Age, men scratched the soil by means of a hoe, which in itself was a remarkable invention. It was made by securely fastening a stick about three feet long to the end of a celt, a piece of stone shaped like a chisel or an ax. This tool looked much like the V-shaped wishbone of a chicken except for the rope, which tightly bound the stick, and the celt, about a foot from the point at which they were joined. Later, in the Bronze Age, copper or bronze was substituted for stone. With this primitive tool, men laboriously stirred the ground in preparation for the seed. By this method of tillage, late neolithic people acquired a certain amount of wealth and security, though only small patches could be cultivated and only small village groups could be supported thus.

Archaeologists have coined the apt expression "hoe culture" to designate this sort of life, a culture still prevalent in some parts of the world. But hoe culture is essentially that culture developed among people of the late Neolithic Age, who lived in small groups and derived at least part of their sustenance from small plots tilled by primitive hoes.

PLOW CULTURE. From the prehistoric hoe came the plow. In the history of inventions we note that one tool or machine is likely to develop into another better adapted to some special kind of work. Before 2000 B.C., someone discovered that oxen, if hitched to the handle of the hoe, could draw the celt, or blade, through the ground. To steady the hoe or plow, one or two handles were fastened to the V-shaped device and guided by a man. There was no wheel, colter, or moldboard as on modern plows. For this reason, it required one man's constant attention to steady the plow while a second person drove the oxen. This primitive type of plow became common in Mediterranean lands. Jesus had it in mind when he said, "No man, having put his hand to the plough and looking back, is fit for the kingdom of God."

The invention of the plow instituted a veritable revolution in agriculture. With such an implement, two men could prepare more ground for seeding than had been possible with old-fashioned stone celts or copper hoes worked by hand. This meant larger and more numerous fields, crops in greater abundance, and a steadily increasing population. Soon larger villages grew up dependent on trade. In this way a "plow culture" came into existence, a term that aptly describes the advanced agricultural life of the Nile Valley and the remarkable culture created by it. Plow culture provided the basis of the unusual agricultural prosperity in Egypt and Mesopotamia.

THE PEASANTRY OF EGYPT. In Egypt the fertile soil provided a sure livelihood for a numerous agricultural population, surplus goods

were produced in quantity, and so it became possible to support certain groups that did not have to labor early and late for a bare subsistence. Thus was created a society of leisure, an elaborate organization of priests, nobles, and rulers, and art and the beginnings of scientific thought were developed. But how did the common people of Egypt, by far the greater part of its population, make a living? We may be sure that the tiller of the soil did this by the sweat of his brow; it must always be remembered that the unceasing toil of the humble provides the material foundation upon which much of civilization is built.

Wheat, barley, millet, sesame, peas, beans, lentils, a great variety of vegetables, and such fruits as dates, figs, grapes, olives, and pomegranates were cultivated. Planting, garnering, and threshing were busy periods. At other times, peasants had to clean out ditches filled by mud, carried by recurrent floods, and erect boundaries, which often were swept away by the swollen Nile. During dry periods, they labored day and night hoisting water by primitive devices to provide artificial irrigation. Domesticated animals, cattle as well as poultry, also needed constant attention. Everlasting toil was the lot of the Egyptian peasant.

Nobles. Large agricultural estates came into existence. They were worked by peasants who really were serfs and belonged to the estate so that when the land changed hands they as well as the cattle, huts, and crops went with it. This type of agricultural management, which came into existence during late Neolithic times, continued throughout ancient times. It is certain that Egyptian methods of cultivation were copied in the Roman Empire and, with modifications, passed on to the Middle Ages.

Egyptian serfs lived in villages and gave a specified number of days of labor to public work such as constructing dikes, cleaning and deepening canals, and erecting temples and pyramids. Such obligations were called *corvées* in the Middle Ages, and the word can be used in describing similar labors in ancient Egypt. Like serfs in the Middle Ages, Egyptian peasants paid dues in kind, that is, a proportion of the produce that they raised on the plots of ground belonging to the estates.

To whom did the estates belong? During the early centuries, nobles and temples owned a large number. The power of the Pharaohs, as the rulers were called, steadily increased and, after the feudal anarchy of the third millennium B.C., supplanted that of the nobles. Henceforth, all Egypt belonged to the Pharaoh and the temples, a condition that was to last until the country was conquered by the Romans.

Ownership on such a scale necessitated a vast organization. Tax gatherers, judges, and other officers were needed. An army of agents represented the Pharaoh's rights and, together with a swarm of officials at the seat of the government, worked under the direction of the vizier.

Ancient Egypt, therefore, was a highly organized bureaucratic state in which the rights of the Pharaoh and the gods took first place. In contrast to present-day social and political ideas, the people apparently counted for little.

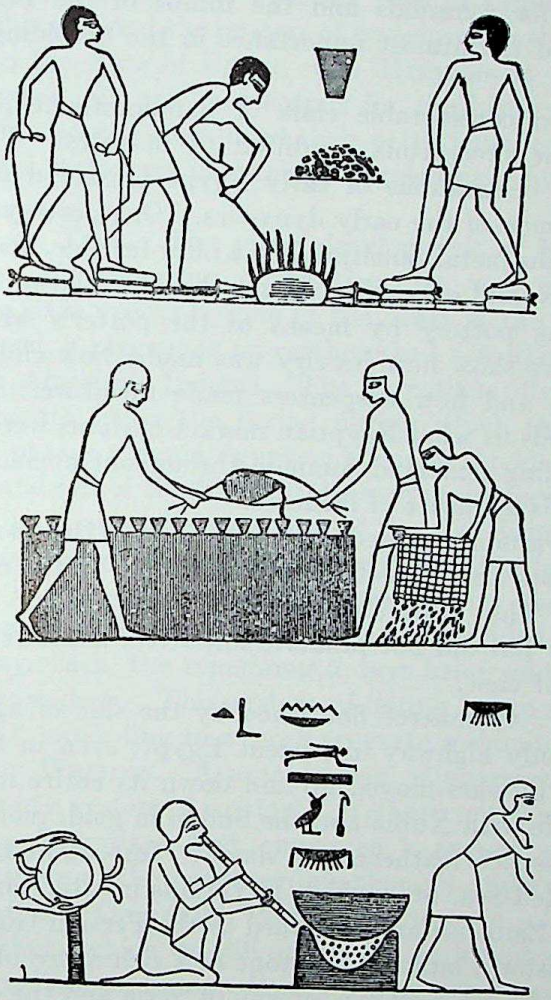


FIG. 11.—Ancient Egyptian metalworkers showing bellows, crucible, and blowpipe.

HANDICRAFTSMEN. A remarkably advanced industrial growth stimulated economic life. Neolithic handicrafts attained great perfection. Thus cloth was woven, especially linen, of a quality probably never surpassed. Even before the potter's wheel was introduced, very fine earthenware was made. About the same period appeared the closed furnace for the smelting of metals. Goldsmiths made fine gold leaf and jewelry by smelting metal in small furnaces, the assistants providing the blast by blowing through reeds. A glass of excellent quality was

also produced. At first bottles and vases were uncolored; but soon the art of coloring was discovered, and fine objects found a ready sale to foreigners. Craftsmen used hammers, bow drills, copper or bronze handsaws, and even ripsaws. The latter were found to be useful in cutting stones for pyramids and the tombs of the Pharaohs and so played a part of the utmost importance in the unfolding economic life of the country.

There was a considerable class of handicraftsmen, as we should expect from the prosperous condition of industry. There are vivid pictures of the occupations of early Egypt preserved on the walls of tombs of noblemen of the early dynasties. One portrays goldsmiths at work weighing the metal, smelting it in a blow furnace, beating it, putting together objects, and engraving them. Another shows the vital operations in making pottery by means of the potter's wheel and closed furnace. Others show how jewelry was made, how cloth and tapestry were prepared, and how carpenters made furniture. A picture of a busy market tells us what Egyptian market customs were like. Market buying and selling remained common throughout ancient and medieval times and still is a feature of business.

The handicraftsmen passed trade secrets on to their sons. They were a hereditary class and, like the peasants, bound to the estates on which they worked. That sons should follow their fathers' craft made for high excellence but did not promote initiative, a disadvantage from the modern point of view.

Commerce. Commerce flourished by the side of agriculture. The Nile was the only highway in ancient Egypt; even in the Bronze Age, ships impelled by oars moved up and down its entire navigable length. There was trade with Nubia and the Sudan in gold, ivory, ebony, gums, frankincense, ostrich feathers, and slaves. Important also was the commerce of the Red Sea, over which Egyptians in later times sailed southward as far as Zanzibar and eastward to the Persian Gulf. Long before the dawn of history, lapis lazuli, stone of a rich azure blue, was brought from Persia to Egypt, perhaps by way of Syria and the delta, which was peculiarly exposed to foreign cultural influences from the north. Copper came from the Sinai Peninsula. Egyptian and other ships sailed to Crete and the Phoenician cities of Tyre and Sidon. By the year 2000 B.C. the Nile Valley, which had vital business relations with foreign lands, was a scene of great economic activity.

Unification of Egypt, about 4000 B.C. The economic and social changes described above produced far-reaching results in every aspect of Egyptian life. Ancient family ways disappeared; tribal life changed into territorial life; old tribal areas became petty states, which, later called "nomes," were to last down to the Arab conquest in 640 A.D. Peasants

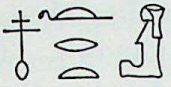
lived in villages surrounded by walls to protect them from human enemies as well as from crocodiles and other savage animals.

Eventually, these groups were conquered by rulers whose names remain unknown. Two kingdoms, Upper and Lower Egypt, were formed. Finally, about 4000 B.C., Menes, ruler of Upper Egypt, united both realms and completed the process of transforming the peoples of the Nile Valley into the state of Egypt, with Memphis at the head of the delta as its capital. It was momentous for the history of civilization that the Egyptian people abandoned their petty tribal communities and began to live in a state vast in extent and ruled over by one sovereign, the Pharaoh.

Reckoning of Time. The social development of Egypt produced many evidences of advancing civilization. It was common during ancient times to date events by one of the years in the reign of a king or by a great flood, a plague, or an earthquake—a method still followed by some North American Indians. The Egyptians divided time into 12 months, a month being the period during which the moon passes through its four phases. Some Egyptian hit upon the idea of connecting the annual rise and fall of the Nile and the sowing, gathering, and threshing of grain with the annual appearance of the star Sirius, or Sothis, at Memphis. Thus there developed the Sothic year of 365 days, so carefully calculated that it was only about six hours shorter than our present scientifically computed calendar year. It was divided into 12 lunar months of 30 days each, the remaining 5 days being added at the close of the year as feast days. This system of dating began in 4241 B.C., or probably 4236 B.C. according to a more accurate reckoning.

Invention of Writing. A notable sign of progress in Egypt was the development of a system of writing. We have noted in the preceding chapter that the Egyptians first employed a system of pictographs. But this cumbersome method of recording thought underwent a remarkable transformation. Originally there had been in all about 2,000 pictographic symbols, which we still see carved on Egyptian monuments. Some represent animal or human forms; others are purely geometrical. Later, 700 signs were in common use, each of which stood for several consonant sounds, but never for more than 3. Vowel sounds were not written out, a fact that makes it difficult for modern students to pronounce ancient Egyptian words. There also were 24 special characters representing 24 sounds.

But the Egyptians never developed true alphabetic writing, for they combined pictographic and alphabetic signs. Thus, for example, in writing the word *nofret*, meaning "girl," they first drew the sign , which stood for the 3 consonant signs *n*, *f*, and *r*. Then they added

, which stood for *f*, for *r*, and for *t* in feminine endings. Finally, they added the figure of a seated woman to prevent mistakes as to the meaning of the symbols. In this way,  stood for "woman."

Papyrus, Reed Pens, and Ink. The Egyptians invented papyrus, a material on which they wrote letters, poems, prayers, hymns, moral maxims, and governmental orders. Stems of the papyrus plant, which grew profusely in swamps and mud flats, were cut lengthwise into thin strips. These were placed side by side, thus forming one layer, to which another was added crosswise and firmly secured by vegetable adhesive. The surface was carefully smoothed and pressed, producing a writing material much like the thick paper that factories turned out several hundred years ago. It is interesting to note that our word *paper* is a lineal descendant of the Egyptian *papyrus*. Another invention of Egyptian handicraftsmen was the reed pen. So efficient was this pen that until the modern steel pen was invented no better writing instrument was devised. The Egyptians also produced ink from the sap of plants; thus we are indebted to the ancient Egyptians for the scrivener's trilogy of paper, pen, and ink.

The Twenty-six Dynasties. In spite of a novel method of measuring time and a remarkable system of recording ideas developed by the Egyptians, it is impossible to draw up an accurate chronology for the history of Egypt. In all, there were twenty-six dynasties, the last closing with the Persian conquest of 525 B.C. For the sake of convenience, these have been arranged in groups beginning about 3400 B.C., a date that is accepted as the end of prehistoric times in Egypt.

The Old Kingdom, from 3400 to about 2475 B.C., the period of the first six dynasties, which ruled at Memphis, is the age of pyramid builders. The Feudal Period, from about 2475 to about 2160 B.C., embraced the Seventh to the Tenth dynasties, which had their capital at Heracleopolis. The next two periods, the Middle Kingdom (2160–1580 B.C.) and the Empire (1580–945 B.C.), included the Eleventh to the Twenty-first dynasties, the capital in both periods being at Thebes. The final centuries of Egyptian independence, from 945 to 525 B.C., comprising five dynasties, were a period of decline characterized by foreign influence and military intervention. By this time, Egyptian civilization had become stereotyped and increative. Egypt henceforth was sacrificed to the political ambitions of Assyria and Persia.

Religion: the Sun God. The story of Egyptian religion is particularly instructive. To understand it, we must bear in mind that there was continuous human life in the Nile Valley from Paleolithic times. The first inhabitants of this region were hunting food gatherers. But

when Neolithic times began, the cultural complex of the Nile Valley, as we have stated, changed. The life of hunters came to an end, and the life of sedentary agricultural workers commenced. A new economy of food production, perhaps the first in the history of man, came into being.

The bright light of the sun, the green verdure of the Nile, the recurrent fruitful and dormant seasons of the year, and the hot winds of the desert, so destructive to crops, tremendously impressed the Egyptians. In their efforts to find an answer to the everlasting riddle of life, they thought that the sun, nature's major force, was god. They called him Ra and built a temple at Heliopolis, where a numerous priesthood paid worship to him. Ra was but one of the gods in Egypt; Ptah ruled at Memphis, Amen-Ra at Thebes, and Horus at Hieropolis, to mention but a few. Often several gods were united to form a new divinity as in the case of Amen-Ra. The more ancient gods were represented as having partly animal and partly human forms. Thus Ptah was shown in the form of a bull, Amen-Ra as a ram, and Horus as a human being with the head of a falcon. Besides these divinities, inherited in part perhaps from far-distant days, there was a prevalent belief in *ka*, the spirit that gave each god his peculiar power. There were many gods, each possessing a special *ka*, or spirit, which sustained and defended life.

Problem of Immortality: Pyramids. To the Egyptians, life beyond the vale of death was very like earthly existence. Consequently, they took great care in arranging the body and constructing the tomb. In early Neolithic times, bodies were buried in the ground, placed on their left side with knees flexed. Vessels of pottery filled with food were distributed around them to nourish the departed. Tools also were put in the grave, for they served as charms to help the spirit continue its life beyond. In early historic times, a stone wall was constructed over the mound above the grave. Soon terraced pyramids were built, and shortly after 3000 B.C. a smooth surface took the place of the steplike exterior.

In 2900 B.C. the great pyramid of the Pharaoh Khufu, or Cheops, was begun at Giza near Memphis. This, the largest structure ever reared by man, covers 13 acres and has sides 755 feet long. Its construction required something like 2,300,000 blocks of limestone, the average weight being about 2½ tons. In one of the chambers under the pyramid the Pharaoh Khufu was buried with numerous vessels containing food. Priests brought food that he might live after death and so sustain the realm and keep its subjects from harm and death. Nobles also found their last resting place in tombs, many of which still stand at Giza near the pyramids of the Pharaohs. It was believed that, like the Pharaoh, they would live beyond death; and so vessels, furniture, and food were interred with them.

The walls of such tombs were covered with pictures, which record the lives of the deceased and were supposed to enable them to continue life after death. These pictures, as we have learned, are valuable documents for the study of the culture of the time.

But it was not enough to provide a safe home for the departed; it was necessary to preserve the body, which remained the abode of the *ka*. So embalming developed, a religious function that became elaborate and in the case of the Pharaohs lasted as long as 70 days. Man has never been ready to accept the fact that he must die; the ancient Egyp-

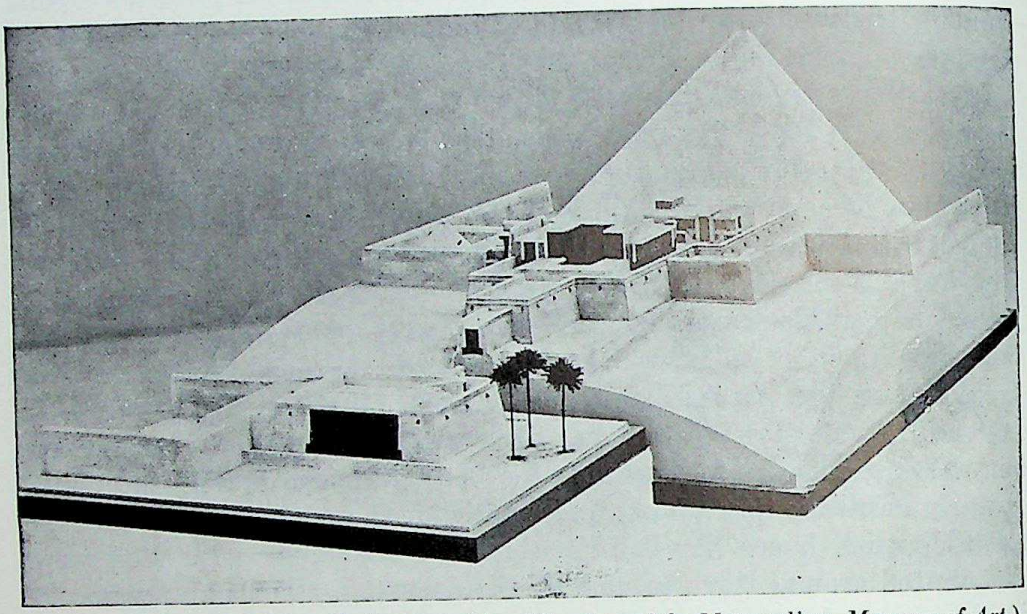


FIG. 12.—Pyramid and temple, from model. (*Courtesy of the Metropolitan Museum of Art.*)

tians attempted to defy the fact by embalming bodies, building indestructible tombs, and developing an elaborate funeral liturgy. To them, life in the hereafter was physical and material.

ISIS AND OSIRIS AND OTHERS. The Egyptians regarded their Pharaohs as descendants and counterparts of Osiris, whose cult assumed the greatest importance. Osiris, the son of Ra, was the god of vegetation, fertility, and the life-giving Nile. Isis, his sister, was his wife. Ra's brother Set hated Osiris with a deadly hate, slew him, and placed his body in a coffin, which floated over the seas. The mourning Isis searched for it far and wide and finally found it at Byblos in Syria. But the implacable Set cut the body into many pieces, scattering them over the land. Again Isis sought them out, and wherever she buried them appeared temples dedicated to the worship of Osiris. Isis had a son by Osiris named Horus, whom she hid among the papyrus plants by the river.

Egyptians were fond of this divine family. As Osiris had lived and died and come to life again, so might the Pharaoh die, live again, and sustain his land. Isis, the solicitous mother and wife, was a popular deity. Horus avenged wrongs and protected the unfortunate. It was believed that, when Osiris passed beyond to rule in the nether world, Horus succeeded him in this life as the sustainer of civilization.

Striking moral ideas appeared during the second millenium B.C. It came to be believed that man's survival in the hereafter depended upon the moral excellence of his earthly life. It was represented that at death

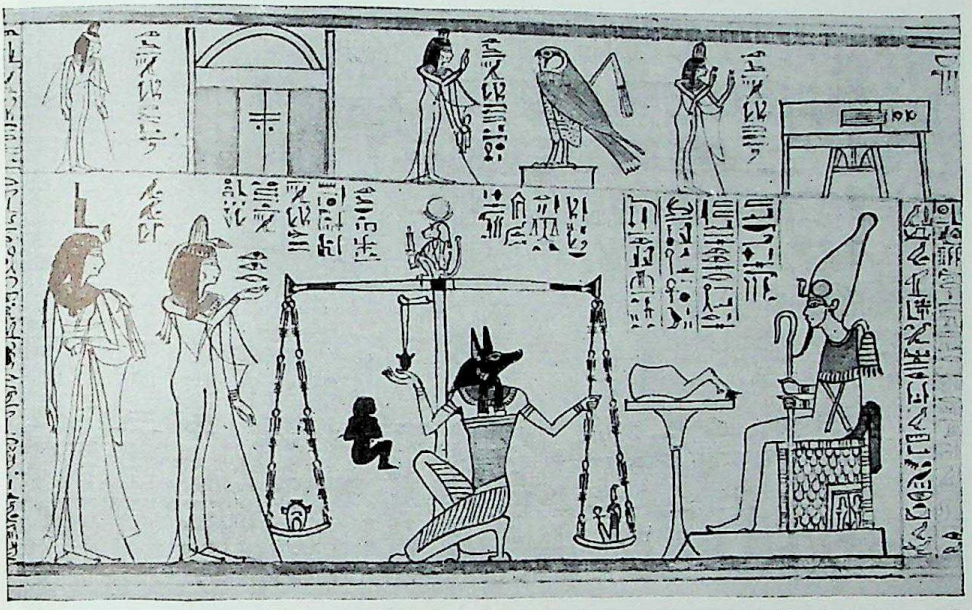


FIG. 13.—Vignette from *Book of the Dead*. Before enthroned Osiris jackal-headed Anubis balances the symbol of truth against the heart of a princess who stands beside the goddess Isis. (*Courtesy of the Metropolitan Museum of Art.*)

his soul appeared before the jackal-headed Anubis, whose scales balanced his heart against a feather, the symbol of righteousness. The ibis-headed Thoth stood behind him, writing down the results of the weighing; and a fierce dog, seated near by, was ready to rend the soul if the decision was unfavorable. The righteous soul, led by the hawk-headed Horus, then passed on before Osiris and entered the fields of happiness. There also was Maat, the daughter of the sun god Ra. She was truth, justice, and righteousness, maintainer of the moral order of which the Pharaoh was the earthly custodian. Thus by the end of the Middle Kingdom many of the cruder material practices of tomb burial during the earlier age of pyramid builders had vanished.

MONOTHEISM: WORSHIP OF ATEN. Great changes in religious belief appeared under the New Kingdom (1580–945 B.C.). The realm of

Egypt had been limited to the valley of the Nile until the Pharaohs began to rule over Syria and other regions. Then the old Amen-Ra became too local and narrow a god for the ruler of so vast a kingdom. Because a Pharaoh governed many peoples, it seemed that his god likewise should rule over all. This more inclusive god was called Aten; the symbol of this monotheistic faith was a disk with many hands reaching from it. Under Amenophis IV (about 1400 B.C.) appeared a noble poem to the one god of all, in which the following lines occur:

> Thou art a craftsman shaping thine own limbs;
> Fashioner without being fashioned;
> Unique in thy qualities, traversing eternity;
> Over ways with millions under thy guidance.

Amenophis IV favored Aten at the expense of the many ancient gods of Egypt and changed his own name to Akhenaten, meaning "Aten is satisfied." A new city was founded at Tell el-Amarna, to become the center of new court life and the new religion. The following is a quotation from one of Akhenaten's beautiful hymns written about Aten:

> Thou dawnest beautifully in the horizon of the sky,
> O living Aten who wast the beginning of life!
> When thou didst rise in the eastern horizon,
> Thou didst fill every land with thy beauty.
> Thou art beautiful, great, glittering, high over
> every land.[1]

The introduction of the monotheistic faith of Aten was startling, for the old gods were completely ignored. The doctrine of a god ruling over all men was a sublime and beautiful one and the source of profound moral inspiration, but it was beyond the capacity of the time. Priestly groups all over Egypt rebelled and, on the death of Tutankhamen, Akhenaten's weak son-in-law, restored the ancient polytheistic religion. The common people continued to practice magic and worship their ancient gods, especially Osiris and Isis. Akhenaten's monotheism, therefore, had little permanent influence, and the common people never advanced beyond crude magic and simple polytheism.

Architecture in the Service of the Dead. Art flourished in Egypt, for it was employed to illustrate and reinforce the teachings of religion. The body and *ka* of the Pharaoh needed a secure resting place, which the pyramids provided. The rooms of the pyramids containing mortuary furniture were fitted with doors. The sides were made with

[1] Breasted, J. H., *The Dawn of Conscience*, pp. 276, 281. Charles Scribner's Sons, New York, 1934.

an accuracy that would do credit to the best modern workmanship. Stones were prepared most carefully; those for the facing of the tomb were joined with the greatest exactness.

The major pyramids are situated on the left bank of the Nile at Giza and southward for many miles, the one built by Khufu being the largest and most famous. The tombs at Thebes are deep recesses cut into the living rock and provided with every trick of the mason's art to guard the resting Pharaohs against desecration. The great temples of

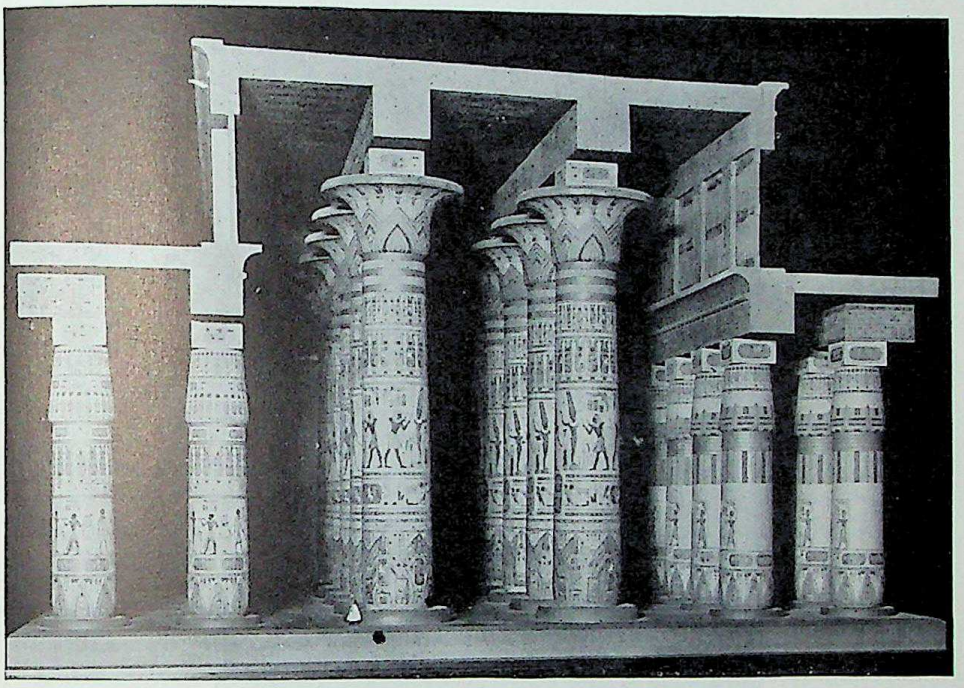


FIG. 14.—Great columns of the temple at Karnak, from model. (*Courtesy of the Metropolitan Museum of Art.*)

the Middle Kingdom and the Empire are most impressive even in their ruins. Vast stone roofs like that of the temple at Karnak were supported by massive columns provided with capitals, the designs of which were copied from the papyrus plant. This use of capitals is seen repeatedly in the construction of the great buildings of other peoples, as for example, the Parthenon in Athens and the cathedrals of the Middle Ages.

SCULPTURE AND PAINTING. Egyptian sculpture attained great heights. It, too, was closely associated with religion, for the carved images of Pharaohs and noblemen helped preserve the memory of their living forms. Many statues still possess a noble bearing and reveal a vigorous personality. There also were vast sculptured scenes done in low relief on the walls of temples, tombs, and memorial slabs, and on the

familiar obelisks. They tell many a story about the Pharaoh's life, government, and religion. Stories were painted on the walls of the tombs and on mummy coffins. In the drawings and paintings, only the side view is portrayed, for perspective was unknown, and the scenes are scattered over a large surface. Telling a vivid tale of the life of three

FIG. 15.—Triad of Egyptian divinities. (*Courtesy of the Museum of Fine Arts, Boston.*)

and four thousand years ago, Egyptian works of art are invaluable documents for the historian of civilization. There also was much fine goldwork, beadwork, and splendid furniture, as was revealed in 1922 when the tomb of Tutankhamen was discovered virtually as it had been sealed thirty-five hundred years ago.

LITERATURE. Literature, like the other forms of art, was in the service of religion and reveals even more vividly than sculpture the Egyptian's passionate protest against death. The *Pyramid Texts*,

Coffin Texts, and the *Book of the Dead* contain prayers, hymns, and incantations in great numbers. Akhenaten's hymn described above was one of those found on the walls of his tomb. The *Maxims* of Ptahhotep, a vizier of the Pharaoh in the twenty-eighth century B.C., deals with man's obligations toward his fellows; it is one of the world's remarkable documents and the first of the kind we possess. In it man is advised how to conduct himself. "Be not proud because of thy learning. Take counsel with the unlearned as with the learned, for the limit of a craft is not fixed, and there is no craftsman whose worth is perfect. Worthy speech is more than greenstone, being found even among the slave women at the millstone." Such wise sayings became popular. All Egyptian art, whether architecture, sculpture, painting, or literature, thus speaks eloquently to us of the gods, morals, life, and the problem of death as they appeared to the people of Egypt.

Egyptian Science. The Egyptians were among the first to study the secrets of nature and develop science. Science strives toward an exact knowledge of the world. It does not suddenly spring into existence; on the contrary, it is of slow growth. The Egyptians were a most industrious people, filling the valley of the Nile with the products of their labor—dikes, pyramids, obelisks, temples, rock-hewn tombs, and statues. Such energy, in order to be successful, had to be directed by men with exact knowledge. Elementary geometry came into existence because an accurate system of measuring was everywhere needed in the flooded valley. In arithmetic the Egyptians used a decimal system without our zero. They had signs for numbers 1 to 9 and for 100, 1,000, 100,000 and 1,000,000. They also computed fractions and used elaborate systems of multiplication and division.

Medicine. There was some progress in medicine, but only embalmers learned anything about anatomy. Healers had few opportunities to learn much about the structure of the human body. Medicine was closely associated with magic and religion, and remedies often were mere charms. Plasters and liniments were sometimes applied, patients were dosed with castor oil, much faith was placed in herbs, and compounds of dozens of useless and frequently disgusting elements were used as remedies. Many of these were transmitted to other peoples and, through Greek scientists like Hippocrates and Dioscorides Pedanius, passed into medieval medical practice and contributed to the lore of modern quacks. The following remedy was said to be efficacious in stopping the crying of a child:

> Pods of the poppy plant [that is, opium],
> Fly dirt which is on the wall,
> Make it into one, strain, and take for four days.

But the Egyptian healers also showed keen powers in diagnosing and treating wounds. The *Book of Surgery* by a court physician has this to say about patients suffering from crushed vertebrae.

> If thou examinest a man having a crushed vertebra in his neck and thou findest that one vertebra has fallen into the next one, while he is voiceless and cannot speak; his falling head downward has caused that one vertebra crush into the next one; and shouldst thou find that he is unconscious of his two arms and his two legs because of it—Diagnosis: Thou shouldst say concerning him, "One having a crushed vertebra in his neck; he is unconscious of his two arms and his two legs, and he is speechless. An ailment not to be treated."

The *Edwin Smith Papyrus* reveals a clear conception of what constitutes scientific procedure. Its author carefully classifies and diagnoses several diseases and prescribes remedies, with little reliance on magical charms. In ordinary practice, however, all sorts of popular and, from our modern standpoint, unscientific ointments, perfumes, embalming substances, enamels, and drugs were made and sold in shops attached to the temples.

Astronomy and Astrology. The Egyptians studied astronomy and established the solar year of 12 months. By 1400 B.C. they had distinguished five planets, Venus, Jupiter, Mars, Mercury, and Saturn. Day and night were each divided into 12 hours. Because stars were thought to influence the course of man's life, astrologers asserted that they could forecast evil and propitious days, and their advice was eagerly sought by the great as well as the lowly.

Egyptian civilization, one of the oldest whose unfolding can be studied in abundant records, presents a fascinating introduction to the general history of culture. Its beginnings are shrouded in the dim dawn of neolithic life, when many cultural contributions of the utmost moment were made. Its unbroken course reveals a multitude of triumphs. Egypt developed the most advanced type of economic life of her day by producing a plow culture that made possible her remarkable commerce, industry, and political organization. The skill of Egyptian handicraftsmen, engineers, and artists is justly admired; and their creative ingenuity is shown in pyramids, spacious temples, panoramic pictures on temple walls, and statues of Pharaohs and other great personages. In addition must be noted the earliest, though rudimentary and often erroneous, steps taken in the development of the sciences. It may truly be said that Egypt led in the development of the sciences of mathematics, chemistry, medicine, and astronomy.

"The high attainments, the permanence, and continuity of Egyptian life, with a fuller record than that of any other country," according to Flinders Petrie, "will always render it the most important human

growth for study, whether socially, politically, or in the history of invention which is the lifeblood of civilization." Egypt's influence upon the civilization of neighboring lands during fifty centuries or more has been incalculable. But significant as Egypt's cultural leadership may have been during those ages it is not without a competitor. In many respects, the civilization of the Tigris-Euphrates exercised an equally potent influence on the cultural development of the dawning historical era. That civilization now demands our attention.

FOR FURTHER READING

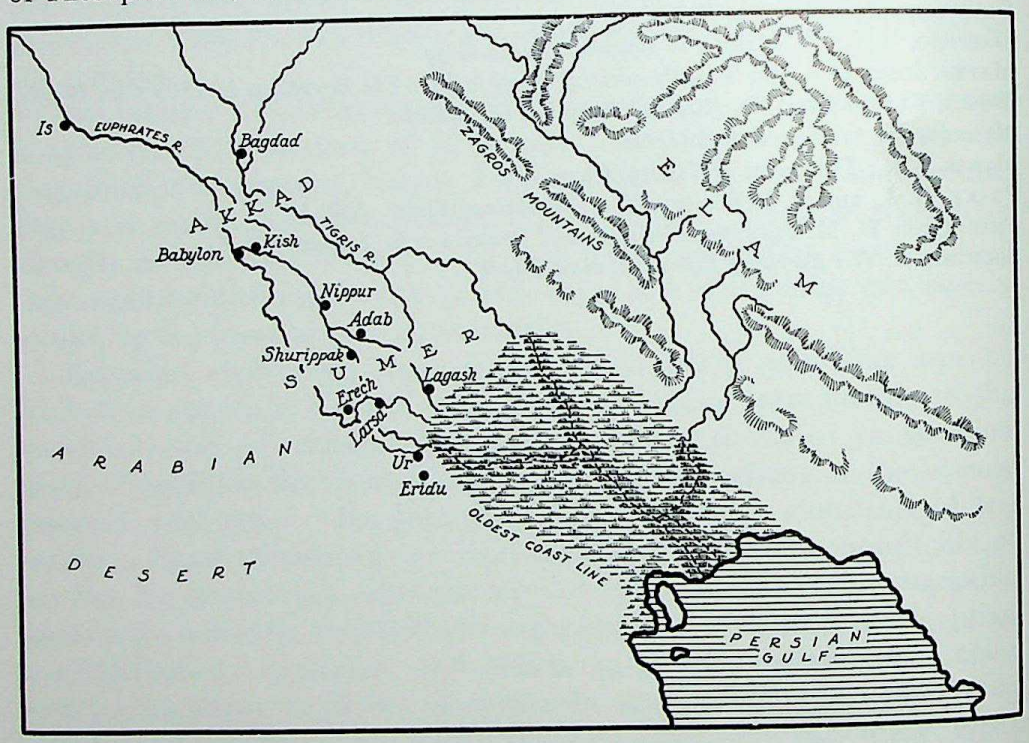
BAIKIE, JAMES: *The Amarna Age*
BREASTED, J. H.: *Ancient Times*, Chaps. III and IV
BUDGE, WALLIS: *The Literature of the Egyptians*
CHILDE, V. G.: *New Light on the Most Ancient East*
ERMAN, ADOLF: *The Literature of the Ancient Egyptians*
———: *Religious Life in Ancient Egypt*
———: *Social Life in Ancient Egypt*
GLANVILLE, S. R. K.: *The Egyptians*
MASPERO, G. C. C.: *Manual of Egyptian Archaeology*
MAYER, JOSEPHINE, and TOM PRIDEAUX: *Never to Die: The Egyptians in Their Own Words*
MORET, ALEXANDRE: *The Nile and Egyptian Civilization*
MURRAY, M. A.: *Egyptian Sculpture*
MYRES, J. L.: *The Dawn of History*, Chap. III
PEAKE, H. J., and H. J. FLEURE: *The Corridors of Time*. Vol. IV
PETRIE, SIR W. M. FLINDERS: *Religion and Conscience in Ancient Egypt*
SHORTER, A. W.: *Everyday Life in Ancient Egypt*

Chapter V

CIVILIZATION OF THE TIGRIS-EUPHRATES VALLEY

A civilization in its unique individuality is fascinating to behold and study.—A. A. Goldenweiser

LIKE the Nile Valley, the Tigris-Euphrates Valley was the scene of man's triumphant efforts to pass from the rudeness of the Neolithic Age to the more brilliant culture of historical times. As in the case of Egypt, it is necessary to study the geographical aspects of Mesopotamia, so called from the fact that it lay between the Tigris



Map III.—Sumer and Akkad.

and Euphrates rivers rising in the Armenian uplands eight hundred miles to the north. For more than two-thirds of their course, these rivers flow through low plains before they pour their silt-laden waters into the Persian Gulf. The lower portion of this valley was known as Sumer; above lay the land of Akkad, extending northward to Bagdad. Sumer and Akkad together were called Babylonia. These lands, like

the delta of Lower Egypt, were built up by vast alluvial deposits carried down through countless ages from the Armenian highlands. But Sumer was geologically the more recent, hence lower and at the mercy of the rivers during months of high water.

The Tigris-Euphrates Valley differs in many respects from the valley of the Nile. Readily invaded from the north, east and west, Sumer and Mesopotamia experienced many political vicissitudes. On the east the valley is bounded by the uplands of the Persian plateau, a region cut up by mountain ranges and deep valleys, some of which led directly into the fertile plains below. To the west and south stretched the barren sands and rocks of Arabia, a desert region almost as extensive as the United States east of the Mississippi. Rainless but for a brief period during winter, Arabia produced little vegetation except around occasional oases. Along its northern border from the Sinai peninsula to the Persian Gulf extended a semifertile belt providing scanty sustenance for wandering Semitic tribesmen and their flocks. Beyond lay a still more fertile tract, which for want of a better name Professor James Breasted has called the "Fertile Crescent." This included Palestine, Phoenicia, Syria, Mesopotamia, Akkad, and Sumer.

Semites of the Desert. Arabia was the home of a people of diverse origins, whose manner of life has been depicted in the stories of Abraham, Isaac, and Jacob in the Book of Genesis. These people were called Semites because they spoke a Semitic language. They did not constitute a "Semitic race," as is often supposed; for there is no Semitic race. They were organized into petty tribes composed of families, who lived by pasturing sheep and goats. At the head of each tribe was a patriarch, who guided his tribe in all its activity.

Such tribes wandered far and wide in search of pasture for their flocks and sometimes clashed as in the case of Abraham and Lot. Semitic tribesmen looked with envy upon the green pastures of Palestine, Syria, and the Tigris-Euphrates Valley and were ever ready to move into these lands by force, if necessary. The Tigris-Euphrates Valley was neither isolated from nor insulated against the covetous nomads of the desert; in fact, it lay invitingly open to them. This is of far-reaching importance in the civilization of western Asia, and we shall have occasion to refer to it repeatedly.

The Sumerians. It is not known whence the Sumerians came or of what race they were; nor is the relationship of their language to others understood. It is certain, however, that they were not Semitic. Perhaps they came from the east about 4000 B.C., moving from the uplands of Persia or from beyond the Persian Gulf into the fertile alluvial plain of Sumer. Here they found an agricultural people, who had already begun to construct ditches and dikes to protect their villages against

the floods. In fact, these lands, like the Nile Valley, had been inhabited from remote times. Artifacts dating from the Paleolithic and Neolithic ages have been discovered in the lower course of the Tigris-Euphrates Valley, and objects from the Copper Age have been found in great number.

A population more numerous than elsewhere, save perhaps in the valley of the Nile, already existed; under the Sumerians, small and prosperous communities grew up, each having its own gods and temples. Petty states evolved, which we can best describe as city-states. Such states were small when compared with the vast extent of modern states,

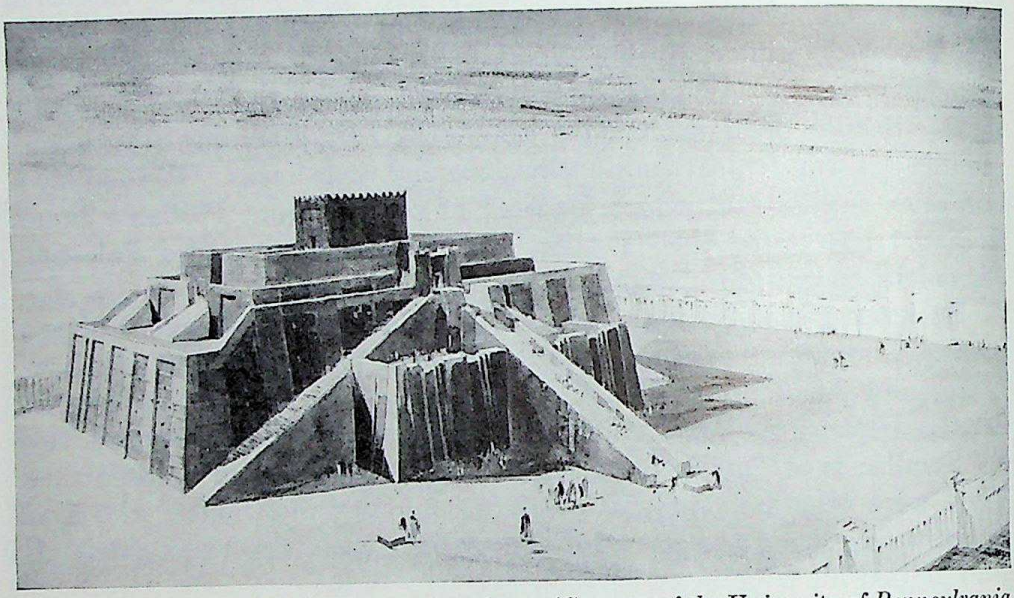


FIG. 16.—Ziggurat at Ur, from reconstruction. (*Courtesy of the University of Pennsylvania Museum.*)

for their lands in each case lay around a city, which served as its religious, economic, social, and political center. Further, the states were independent, carried on war with each other, and, in short, acted like great territorial states. Among the most important in Sumer were Ur, Larsa, Eridu, Umma, and Lagash. Each was governed by a *patesi*, who was ruler, commander, and chief priest. He represented the god of the city-state; through him the god spoke to the people. The priest-rulers formed long dynasties and, according to ancient accounts, ruled an incredible number of years.

AGRICULTURE. Like the Egyptians, the Sumerians were a most industrious people. Agriculture flourished; vast fields of grain and vegetables covered the country. Extensive canals with dams and dikes were constructed, and irrigation provided constant moisture. The Sumerians used a plow developed from the old neolithic hoe, but addi-

tionally equipped with a sort of tubular seed drill. Plow culture therefore became an early characteristic of the food-producing economy of Sumerian society.

The date palm was a common source of food, and dairying and the raising of bees were important occupations. The chief animals for pulling carts or chariots were oxen and donkeys. Sheep, goats, cows, pigs, dogs, and poultry were plentiful. The resulting increase in food supply explains why so many populous and powerful city-states could be sustained.

Commerce and Industry. Because the soil of Sumer was alluvial, copper, gold, silver, and stone had to be imported. A brisk trade sprang up with strangers to north, east, and west and perhaps even beyond the Persian Gulf. Necessaries were paid for by the superior products of Sumerian industry, such as woolen and linen cloth, leather, and foodstuffs. Business letters, receipts and bills of sale, loans, and interest were common features of this busy life. This means that in addition to the large peasant communities there also developed at an early date an extensive class of merchants, who made their living by buying and selling foodstuffs and dealing in manufactured articles.

The Arts. Temples and houses were constructed from sun-baked brick, which after the cities decayed produced the great mounds of rubbish still to be seen dotting the plain and awaiting the spades of excavators. Towns were surrounded by walls of brick. The streets of the older towns were constructed without plan, but in newer centers they crossed each other at right angles. In the midst of each city stood a temple, by the side of which rose the *ziggurat*, a tower composed of a series of cubes, each smaller than the one below, with flights of stairs leading to the shrine on top.

Sumerians were skillful builders, using such architectural forms as the arch, vault, and dome, later to be appropriated by the architects of the Greek and Roman world. Their goldsmiths made magnificent gold and silver vessels, their potters the finest stone vases, cups, and bowls of lapis lazuli and obsidian. Sumerian stonecutters became famous for their clever carving of small figures on hard stone surfaces such as cylinder seals.

Cuneiform Writing. Picture writing had long been used by the Sumerians; by the dawn of the historical era, it became phonetic. Wedge-shaped characters impressed upon moist clay tablets were baked to permanence. Vast numbers of such tablets have been unearthed by archaeologists, enabling scholars to piece together the Sumerian cultural puzzle. Their writing was called "cuneiform," *cuneus* being the Latin word for wedge. This writing was adopted by Semitic invaders of the Tigris-Euphrates Valley such as the Babylonians and Assyrians and

even by non-Semitic Hittites. On the other hand, the language of the Sumerians became a dead tongue as Semitic peoples moved into Sumer, surviving only in religious services, much like Latin in our own time.

Religion. Inasmuch as each city-state had its special gods, the Sumerians had a host of divinities. At first, the gods of a victorious city conquered their rivals, and the greatest confusion resulted; but gradually a more or less ordered pantheon was formed. Thus Anu became the supreme god of the sky, En-lil of air and earth, and Ea of the waters of the sea. Ishtar, daughter of Anu, was the popular goddess of fertility. These and other gods, together with their families, dwelt in temples. They were served by priests, who made libations, consulted omens, and performed rites of purification. The priests read the deep

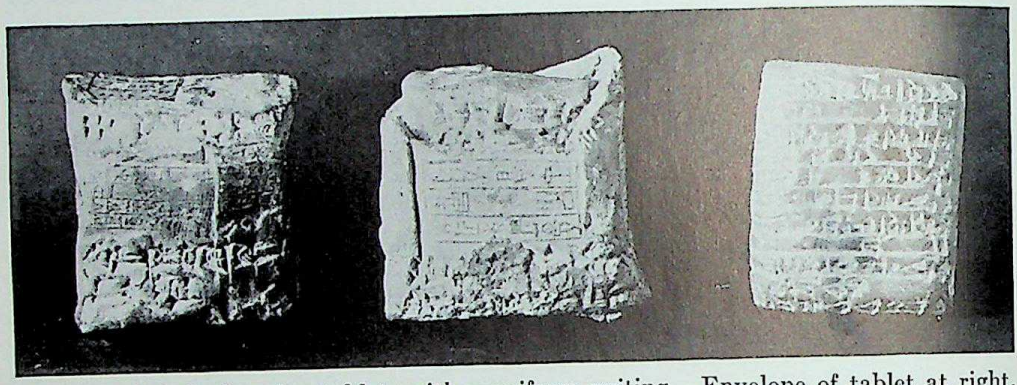


Fig. 17.—Babylonian clay tablets with cuneiform writing. Envelope of tablet at right. (*Courtesy of The New York Times.*)

secrets of the gods from the appearance of the liver and entrails of slain animals. They also read the will of the gods from the way oil dropped into water, much as some people today tell fortunes from tea leaves in the bottom of a cup. All sorts of signs were looked for—a white dog entering a palace meant that a siege was at hand. Dreams revealed the course of events, and astrologers claimed they could predict the future.

Early religion specially stressed the direct relation of man to gods, Sumerian religion being no exception to this rule. The gods had to be propitiated and so received food in the form of sacrifices regularly performed in temples. There also were human sacrifices. Dead rulers were accompanied into the beyond by the spirits of their attendants, guards, and draft animals. A royal tomb at Ur, opened in 1928, revealed after the lapse of forty-five centuries what usually happened. When this ruler died, the gentlemen and ladies in waiting were forced to attend the master's spirit into the dark nether world. All these, some forty in number, were marched to the tomb, accompanied by wagons drawn by oxen. When the tomb was opened, their bodies were found exactly

where they had fallen, with the forms of six guards in full panoply ready at the entrance to protect the spirits.

Religion was centered in fear of the gods and sacrifices to gain their favor. The following verses dating from Assyrian times set forth the ancient Sumerian religious feeling:

> Each day pay thy homage to thy god:
> Sacrifice, prayer, worthy incense.
> Before thy god have a pure heart:
> That is what is pleasing to the deity.
> Supplication, prayer, and prostration
> Thou shalt render every morning and he shall
> grant thee treasures.
> And thou shalt abundantly prosper, thanks to thy god.

Likewise, there was a deepening sense of personal guilt and unworthiness. Penitential psalms give us a hint of this feeling.

> Lord, my sins are many and my faults are grave!
> My god, my sins are many and my faults are grave!
> My goddess, my sins are many and my faults are grave!
> O god, whom I know or whom I know not, my sins are many
> and my faults are grave!
> O goddess, whom I know or whom I know not, my sins
> are many and my faults are grave!
> Let the anger be assuaged in the heart of my lord.

Science. In science, the Sumerians and their successors made noteworthy progress. As in the case of Egyptian science, however, such scientific progress came from practical experience in advanced economic, social, and political life and not from systematic reflection as in the case of the Greeks. Egyptian and Sumerian science is to a considerable extent empirical, that of the Greeks reflective and often experimental.

The Sumerians reckoned by sixties. There were 60 seconds in a minute, 60 minutes in an hour, and 60 shekels in a pound, or *mina*. The circle was divided into 360 (6 times 60) degrees. The year was composed of 12 lunar months of 30 days each; but since by this mode of reckoning 5 days in each year were lost, rulers occasionally intercalated an extra month whenever it seemed necessary to catch up with the yearly course of the sun. In some years, accordingly, there were as many as 390 days. Day and night were each divided into 12 hours. This is at least one source of the custom of reckoning by twelves, as, for example, 12 inches in a foot and 12 eggs in a dozen. As in Egypt, the Sumerians named the years after a striking event, instead of numbering them.

Astronomy and Astrology. Discovering that the sun appeared each day, vanished during the night, and repeated its cycle each year, the

Sumerians further noted that the stars operated according to a fixed rule. Because the sun was the beneficent creator of crops and sustainer of man and beast, they inferred a causal connection between the majestic circling of sun and stars and the destiny of man. They identified the planets and named them after their gods, a practice taken over by the Romans, who named the planets Venus, Jupiter, Mars, Mercury, and Saturn after their own divinities.

The science of astrology was elaborated by the Babylonians and more especially by the Assyrians, successors of the Sumerians and inheritors of their culture. From the heights of modern scientific knowledge, astrology appears but quackery; and such indeed it is if we see in it little more than the fraudulent practices of fakirs. But we should bear in mind that long before genuine science developed man had to make a beginning in his inquiry into the nature of things, and such beginnings inevitably were slow and erroneous. In astrology we recognize a genuine attempt to solve the riddle of things.

Astrology, however, was not wholly a theoretical matter. By the study of heavenly bodies it was believed possible to predict the fate of individuals and states. The sun passed through twelve constellations, as in our zodiac—each position exerting a characteristic influence. Predicted eclipses of the sun or moon were thought to be especially disastrous periods. Priests studied these phenomena carefully and evolved a complicated method of foretelling the future. There is a striking reference to this practice by Isaiah, who objected to it:

> Thou art wearied in the multitude of thy counsels. Let now the astrologers, the stargazers, the monthly prognosticators, stand up and save thee from these things that shall come upon thee. Behold they shall be as stubble; the fire shall burn them; they shall not deliver themselves from the power of the flame; there shall not be a coal to warm at, nor fire to sit before it [Isa. 47; 13–14].

Liver Divination. Astrology was a noble cult when compared with some of the baser Sumerian ideas. As early as Paleolithic times, men had carefully observed animals and acquired a wide knowledge relating to their habits. The seat of life and power was thought to be a part of the body, the heart, kidneys, breath, or liver. Sumerians thought that the liver contained the secret of life and in sacrificing animals, particularly sheep, noted its aspect. A complicated set of ideas resulted, whereby priests ascertained the will of the gods regarding individuals and states. Clay models of livers with regions carefully marked off for divination were widely used. The Romans also used this method, as all who have read Vergil or Livy know. Such study of the animal world, however, did not lead to scientific knowledge. Nor could medicine make much progress so long as it was thought that disease might be

driven out of the body or averted by means of magic or induced by means of a curse.

MILITARY LIFE. One remarkable feature of Sumerian life was the attention paid to military matters. This was necessary because the city-states were constantly at war with each other. Each patesi organized an effective army of infantry provided with copper helmets, armed with spears, and armored with thick and heavy clothing for protection against the thrust of enemies. By means of superior military tactics and fighting equipment, including war chariots drawn by asses, Sumerian armies were victorious over the Semitic nomads who encroached upon the fertile lands of the city-states.

Fighting was cruel and bitter. The capture of a city was usually followed by the indiscriminate slaughter of prisoners, looting of temple treasures, and destruction of houses. The demolition of Lagash by Lugalzaggisi, patesi of Umma, was lamented in a poem of which the following fragment has been preserved:

> The men of Umma have set fire to the Eki-kala, they have set fire to the Antasurra,
> They have carried away the silver and the precious stones.
> They have shed blood in the palace of Tirash, they have shed blood in the Abzu-banda;
> They have shed blood in the shrine of En-lil and in the shrine of the sun god;
> They have shed blood in the Akush,
> They have carried away the silver and the precious stones. . . .
> They have shed blood in Abzu-ega, they have set fire to the temple of Gatum-dug;
> They have carried away the silver and the precious stones and have destroyed the statue. . . .
> They have removed the grain from Ginarbaniru, from the field of Ningirsu, all of it that was under cultivation!
> The men of Umma, by the despoiling of Lagash, have committed a sin against the god Ningirsu!
> The power that is come unto them from them shall be taken away!
> Of sin on the part of Urukagina, king of Girsu, there is none.
> But as for Lugalzaggisi, patesi of Umma, may his goddess Nidaba bear this sin upon her head![1]

[1] WOOLLEY, C. L., *The Sumerians*, pp. 70–71. The Clarendon Press, Oxford.

Sumerian independence came to an end by 2900 B.C. The city-states of Sumer had expended much energy in maintaining efficient military organizations, but the armies began to decay and no longer were able to defend the country. The peasants, too, after generations of peaceful tilling of the soil, became soft and unfit to handle weapons. Sumerian agriculturalists no longer were a match for the vigorous and hardy Semitic folk from the Arabian Desert, who crowded into Akkad and overwhelmed the Sumerians living there. Finally one of their kings subjugated all Sumer. The newcomers were inferior to the Sumerians in material and higher culture. So, on settling in Akkad, they at once began to absorb the more advanced civilization about them.

As a people, the Sumerians vanished, and their city-states were absorbed; but their cultural complex was taken over first by the Babylonians, then by the Assyrians, next by the Chaldeans. It is difficult to distinguish clearly the contributions of each of these new elements. Much of this culture finally was inherited by the Greeks and Romans, who passed it on to our medieval forebears.

Stages of Mesopotamian History: First Stage. Over and over again the Semitic peoples of Arabia invaded the Fertile Crescent, and each time they experienced profound cultural changes. A pastoral folk, possessing a scanty civilization, they gave up their shepherd ways and became prosperous peasants or wealthy traders living in cities. Three stages in Sumerian and Mesopotamian history may be noted. The first is that of Sumer and Akkad, which became Semitic in language at the time of Sargon of Akkad. Other Semitic-speaking people, the Amorites, later occupied Babylon and extended their control over Akkad and Sumer. Their greatest ruler was Hammurabi (1948–1905 B.C.); their state was called Old Babylonia. Sedentary agricultural and urban life made the Amorites, or Babylonians, like the Sumerians before them, unfit to resist the vigorous Hittite newcomers who, about 1900 B.C., descended upon them from the uplands to the north. The Hittites were followed by Kassites, whose great contribution was to introduce the practice of extensive horse breeding into Mesopotamia. This revolutionized the ways of men who hitherto had used only the ass, donkey, or ox. The Kassites, rude and comparatively uncivilized, temporarily brought Babylonian civilization to a halt.

In Sumer and Akkad the gods owned vast estates, administered by priest-kings. The inhabitants also had lands and numbers of cattle. The rights of the gods and the wealthy were sanctified by religion as interpreted by the priests and the priest-kings. These varied interests had to be regulated; hence, law, which consists of rules governing the relation of man to man, developed much more rapidly among the inhab-

itants of Sumer and Akkad than in Egypt, where the gods and Pharaoh were the chief property owners.

The law of the Sumerians was codified by Hammurabi, the world's first great legal genius. His was a vigorous rule, regulating carefully relations among the teeming population. He brought together the old laws dealing with the agricultural, business, religious, and governmental life of ancient Sumer and Akkad, as well as those of his own Amorite people. After having reduced them to the simplest and briefest form, he carved them on a hard diorite shaft 8 feet high, which was set up in the temple of the great god Marduk at Babylon. This was the proper place for the code because law was believed to have been instituted by the gods, a common idea in ancient times.

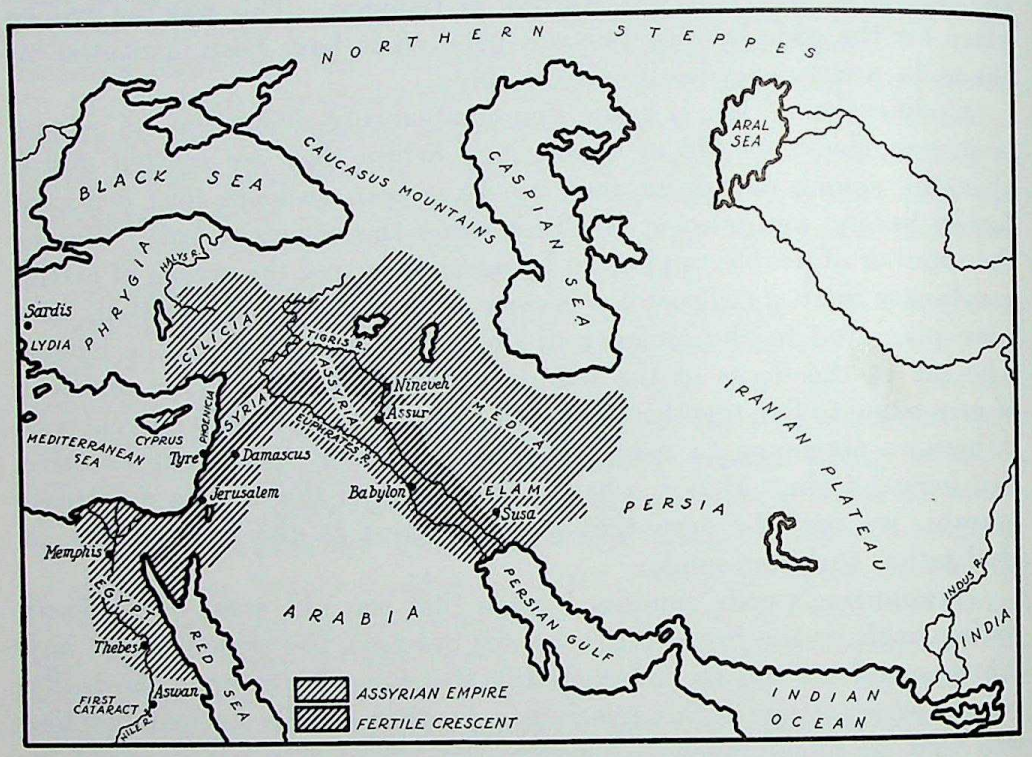
Codification of law is a sure sign of advancing civilization. Customs evolve in the daily life of people long before they are written down. Customs among paleolithic men can have been no more than ordinary family habits, and even in Neolithic times this remained true. But as the number of people, supported by agriculture and the raising of cattle, constantly multiplied, customs became more complex. Unwritten, they were preserved in the memory of the people as well as of the judges, who sat at the doors of the temples. When, however, large numbers of men came to live together, doing all sorts of things to gain a livelihood, it became necessary to reduce the many customs to a comprehensive and logical form. Hence, when a ruler codified the law, as did Hammurabi, we may be sure that great progress in the development of civilization had been made.

Hammurabi's code contained much that was old, some of the ideas dating back to the Stone Ages, as, for example, the principle that any injury sustained was to be inflicted in the same degree upon the guilty person or upon one of his relatives. Another equally ancient practice was that of blood revenge, whereby the killing of a person could be atoned for only by the death of the killer or one of his kin. Revenge seems to have been the basis of justice in primitive legal relations; modern law in some cases still is not wholly free from this principle.

The code of Hammurabi also provided for the ordeal, an ancient method of determining whether the accused was or was not guilty. A person charged with sorcery was cast into the river and, if he drowned, was regarded as guilty and his accuser awarded his property. In this way, it was believed, the gods showed whether one was guilty or innocent. Another primitive feature was to assess fines according to the political or social status of the person who had been wronged. Stealing from the gods formerly had been punishable by death, but this had been modified by Hammurabi's time. Thus, if an animal had been stolen from a

temple, the fine was thirtyfold the value of the animal. If the animal had been stolen from a man of low status, the fine was only tenfold.

A more civilized feature of the code was the substitution of money payments for such penalties as the mutilation of an eye or the breaking of a bone to avenge a similar injury inflicted on another. Destroying an eye of a man of low estate might be atoned for by paying 60 shekels or in the case of a slave by paying only 30 shekels. In general, old and barbarous punishments were abrogated and the more civilized monetary penalties substituted. This humane principle pervaded most



Map IV.—Empire of the Assyrians.

aspects of men's relations in Babylonian society and was enunciated with great care in Hammurabi's code.

Second Stage: Assyria to 606 B.C. The second phase of Tigris-Euphrates civilization was that of Assyria. Its center was Assur, a town on the banks of the Tigris, occupying a geographically strategic position that could be easily defended. The Assyrians, who spoke a Semitic language, had moved from the barren wastes of Arabia into Mesopotamia long before 2000 B.C. After appropriating the superior agricultural and urban methods of the people inhabiting this region, they began to extend their rule over the Fertile Crescent. They seized Damascus (732 B.C.), Palestine, and even the delta of Lower Egypt. The four greatest rulers of Assyria were Sargon II (722–705 B.C.), Sen-

nacherib (705–681 B.C.), who moved the capital to Nineveh, Esarhaddon (681–668 B.C.), and Ashurbanipal (668–626 B.C.). But the stern and brutal government of the Assyrians, the contemptuous disregard of the rights of subjects, and the extremely cruel suppression of revolts produced the bitterest hatred. Chief of their enemies were the Chaldeans, who occupied Akkad and Sumer. Originally they were a Semitic tribe that, like the Akkadians and Assyrians, became powerful politically. In their great hatred of the oppressor, they joined with the Medes and Persians and stormed, sacked, and destroyed Nineveh, putting an end to the Assyrian state in 606 B.C.

The Assyrian state occupies a unique place in the history of organized societies. Its rule over the entire Fertile Crescent from the Persian Gulf to Palestine, forming a state larger than any hitherto developed, was made possible by the use of horses, war chariots, and tools made from iron, a new metal of revolutionary importance, as we have learned above. Widespread use of the domesticated horse proved most important in transforming life, comparable in significance with the domestication of the cow, sheep, goat, and fowl. The latter animals produced food and also clothing of skins or wool. The ox became an indispensable draft animal in neolithic and Bronze Age agriculture. But the horse, far speedier as a riding and military animal, was not domesticated until much later although the exact date cannot be ascertained.

Horses had been hunted for food far back in the Paleolithic Age, as is proved by bones found in refuse heaps dating from those times. Drawings of the horse were common in Magdalenian times. In some regions during the Neolithic Age, this animal apparently was the object of worship. Although man, therefore, had long been well acquainted with the horse, these fossils and pictures do not prove that the horse was domesticated in prehistoric days.

First traces of the use of domesticated horses are found among the Sumerians shortly after 3000 B.C. They were not employed extensively, since oxen were still used for plowing and asses or donkeys for transporting burdens either by carrying them on their backs or by hauling them in carts or wagons. Horse breeding and the use of horses as the general basis of the economy of an entire people appeared for the first time in the Tigris-Euphrates Valley among the Kassites, a rude people possessing a culture inferior to that of the Sumerians and Semites of Babylon.

Unfortunately, little is known about the origin of the large-scale use of horses. It may possibly be traced to the steppes stretching from the Danube River Valley in Europe eastward to the Altai Mountains in Central Asia. Peoples occupying these extensive grazing regions developed a nomadic type of life. They pastured flocks and rode horses, which were also used as milch animals. The poet Homer refers to these

wandering peoples as "horse milkers." Perhaps the Kassites who lived on the Persian highlands for a long time before they crossed over the Zagros Mountains into the Fertile Crescent about 1750 B.C. learned horse raising from the nomadic peoples of the Asiatic steppes. Other peoples who closely resembled the Kassites in culture moved into the Fertile Crescent. Among them were the Mitanni, who settled in the northern parts of the Fertile Crescent, and the Hittites, who founded a powerful state between them and the Black Sea. Each of these peoples made effective use of horses, especially in war.

Horses revolutionized travel and communication, and commercial life in particular received great stimulus. Diplomatic intercourse and governmental administration became more effective. Armies of horsemen and chariots proved irresistible, and it became possible to make extended conquests and govern greater areas than ever before. The introduction of the horse as a riding and military animal was as revolutionary in the life of the second millennium B.C. as the invention of the locomotive, steamboat, or automobile has been in our own time. It made possible the great political state of Assyria, which extended its conquests over the entire Fertile Crescent and Egypt. Without the swift communication provided by the horse the government of this most extensive state the world had yet seen could not have been maintained. In order to govern so large an area with so many subject peoples, it was necessary to develop a military despotism controlled in the minutest detail. Military roads were built, royal messengers were appointed, and an elaborate system of reporting matters of political importance came into being. Whenever necessary, the army went forth with chariots of iron drawn by fleet horses to scatter the enemy or with ironshod battering rams to lay low a rebel city.

Though Assyria maintained its ascendancy by a policy of blood and iron, this is but one side of the picture. This vigorous state also encouraged trade and industry. Skilled workmen came from all parts to build the magnificent palaces of the capital of Nineveh. Precious articles were imported from north, east, south, and west, and Assyria became the wealthiest state that had yet existed. Splendor reigned in the court of the kings. Sculptures of man and beast—the latter unsurpassed in vigorous realism by any animal sculpture in antiquity—the great library of clay tablets with cuneiform inscriptions belonging to King Ashurbanipal, and costly jewelry—all are evidences of the richest civilization that had yet appeared.

THIRD STAGE: CHALDEA, 606–539 B.C. Chaldea, or New Babylonia, represents the third stage of Tigris-Euphrates cultural history. The ancient city of Babylon became the capital of the new Chaldean Empire, which embraced Sumer, Akkad, Assyria, Damascus, and Palestine. The

MAP V.—The Near East, about 600 B.C.

Chaldeans flourished for less than a century in spite of the fact that their state was powerful and their rulers were vigorous. Their imperial rule was resented by their subjects; and finally, in 539 B.C., the empire fell before the attacks of the Medes and Persians, Indo-European peoples living to the east in the Persian uplands. These newcomers now founded a great empire on the ruins of Babylonia and Assyria. The conquests of

FIG. 18.—Assyrian "winged bull." (*Courtesy of the Metropolitan Museum of Art.*)

the Semites were over; not until the days of Mohammed in the seventh century A.D. were a Semitic people again to burst forth from the desert as conquerors.

A great body of literature, which first took form among the Sumerians, flourished with many changes among the Babylonians, Assyrians, and Chaldeans. The theme of creation remained popular, as illustrated by the Sumerian or Babylonian *Poem of Creation*, which celebrates the work

of the god Marduk. It is a stately poem narrating the encounters of the gods, in which Marduk emerges victorious. There is also the famous Sumerian *Story of the Deluge*. The hero Ut-napishtim, who lived in the city-state of Shuruppak, built a great ship at the command of a god and put all his family and goods therein, together with his cattle and other beasts. A great rainstorm came, and all living creatures perished. Finally, when the storm abated, Utnapishtim opened a door.

I sent forth a dove, letting it free.
The dove went hither and thither;
Not finding a resting place, it came back.
I sent forth a swallow, letting it free.
The swallow went hither and thither;
Not finding a resting place, it came back.
I sent forth a raven, letting it free.
The raven went and saw the decrease of the waters.
It ate, croaked, but did not turn back.
Then I let all out to the four regions and
brought an offering,
I brought a sacrifice on the mountaintop.
Seven and seven adagur jars I arranged.
Beneath them I strewed reeds, cedarwood, and myrtle.
The gods smelled the odor,
The gods smelled the sweet odor,
The gods like flies gathered round the sacrificer.

Especially interesting are the poems dealing with Ishtar, the great mother goddess of Sumerians, Babylonians, and Assyrians. She was the parent of fertility, the sustainer of field and flock, a goddess typical of older neolithic and Bronze Age cultures. Her love was rejected by Tammuz, and so she wandered, visiting even the nether regions.

To the house of shadows, the dwelling of Irkalla,
To the house without exit for him who enters therein,
To the road whence there is no turning,
To the house without light for him who enters therein,
The place where dust is their nourishment, clay their food,
They have no light, in darkness they dwell.

In order to explain the profound mystery of life and death, poetic imagination created the theme of Ishtar. The Gilgamesh Epic tells of a hero who had won the enmity of Ishtar for slaying a bull sacred to her. His strength faded away; he faced death. The maid Sabitu, whose help he had sought, speaks to him as follows:

O Gilgamesh! why dost thou run in all directions?
The life that thou seekest thou wilt not find.

When the gods created mankind,
They determined death for mankind;
Life they kept in their hands.
Thou, O Gilgamesh! fill thy belly,
Day and night be thou merry,
Daily arrange a merrymaking,
Day and night be joyous and content!
Let thy garments be pure,
Thy head be washed, wash thyself with water!
Regard the little one who takes hold of thy hand,
Enjoy the wife lying in thy bosom.[1]

It is clear that Mesopotamian civilization, like the Egyptian, is very ancient. Reaching back far into prehistoric times, it sprang from the intensification of life in the late Neolithic Age. A peculiar feature of this civilization was its complex character. Owing to the exposed nature of the Tigris-Euphrates Valley, Mesopotamia received influences from every side, each one in turn modifying the original contributions of the Sumerians, whose culture still persisted, withstanding all political changes and movements of population. Mesopotamia became the center of a vigorous cultural diffusion, which for centuries profoundly influenced later civilizations in Europe, Asia, and Africa.

FOR FURTHER READING

Breasted, J. H.: *Ancient Times*, Chaps. V and VI
Chiera, Edward: *They Wrote on Clay*
Delaporte, L. J.: *Mesopotamia: The Babylonian and Assyrian Civilization*
Jastrow, Morris: *The Civilization of Babylonia and Assyria*
———: *The Religion of Babylonia and Assyria*
King, L. W.: *A History of Babylon*
———: *A History of Sumer and Akkad*
Maspero, G. C. C.: *The Dawn of Civilization: Egypt and Chaldaea*
Olmstead, A. T. E.: *A History of Assyria*
Smith, Sidney: *Early History of Assyria to 1000 B.C.*
Westermann, W. L.: "On Inland Transportation and Communication in Antiquity," *Political Science Quarterly*, Vol. XLIII, pp. 364–387, 1928
Woolley, C. L.: *The Sumerians*
———: *Ur of the Chaldees*

[1] Jastrow, Morris, *The Civilization of Babylonia and Assyria*, pp. 450, 454, 462–463, J. B. Lippincott Company, Philadelphia, 1915.

Chapter VI

PHOENICIAN AND HEBREW CONTRIBUTIONS

The Jews, without reference to their religious belief, are among the most remarkable people in the annals of mankind.—H. H. Milman

WE HAVE traced the rise of the civilizations of the Nile and the Tigris-Euphrates valleys but have said little about the diffusion of Egyptian, Sumerian, and Babylonian culture to distant and less advanced peoples. The dissemination of the cultural achievements of these civilizations was largely due to the energy of Semitic peoples living in the northern and western bend of the Fertile Crescent—particularly in Syria, later known to the Greeks as Phoenicia, or the "land of palms."

Syria, together with Palestine, extended along the eastern shore of the Mediterranean for a distance of about four hundred miles. Bounded on the east by a barren desert, Syria was a narrow strip of country varying from 85 to 100 miles in width. At the extreme north were two mountain ranges, the Lebanon and Anti-Lebanon, between which lay a fertile valley watered by the Litani River. Covered with extensive cedar forests, the Lebanon Mountains were the source of valuable timber. The uplands of Phoenicia provided excellent pasturage, and the lower parts were suitable for agriculture. Although the northern coast was shut off from the back country by the Lebanon Mountains, Phoenicia possessed excellent harbors.

To the south of Mount Carmel lay Palestine, a country with an area of less than ten thousand square miles. Its coast was harborless, and its predominantly hilly country supported a scanty vegetation. Palestine had an insufficient rainfall and, unlike the Tigris-Euphrates Valley, was incapable of irrigation. To the south lay the bleak sands of the Desert of Sinai. Palestine lacked the economic basis for a powerful state; but Phoenicia, with its excellent harbors, was destined to become a thriving commercial center.

A glance at the map of western Asia reveals another peculiarity of Phoenicia and Palestine—their geographical situation with reference to the great powers of the time. Egypt lay to the south, the Tigris-Euphrates Valley to the east. Phoenicia and Palestine occupied the northern part of the Fertile Crescent, a route actively traversed from time immemorial by traders, travelers, and wandering peoples moving between the Nile and the Tigris-Euphrates valleys. Phoenicia and Palestine

therefore were to feel constantly the cultural influences of both Egypt and Babylonia.

PHOENICIA, CENTER OF CULTURAL DIFFUSION. Let us first discuss the contributions of the Phoenicians to the history of civilization. In early times, probably shortly after 3000 B.C., they were roving Semitic pastoral folk who moved out of the Arabian Desert into the pleasant region of Phoenicia. Magnificently situated for business, the great harbors of Tyre, Sidon, Gebal, Berytus, and Byblos became logical centers for trade with Egypt, Babylonia, and the Hittite areas to the north. To the west stretched the Mediterranean and Aegean seas, to the north the Black Sea.

The people inhabiting the regions bordering upon these waters in many cases retained the culture of the Bronze Age. Some of them had hardly emerged from the rude conditions that we associate with Neolithic times. Trading with such economically backward peoples, the Phoenicians became the most important businessmen of the day, penetrating into every corner of the Mediterranean, Aegean, and Black seas. They tapped the resources of these regions, securing quantities of metals and other raw materials in return for artistic and practical articles that they manufactured themselves or bought from Egyptians.

PHOENICIAN INDUSTRY. Phoenician commercial leadership rested upon an extensive industrial activity. The purple dye manufactured from the small sac behind the head of the *murex*, a species of shellfish, was widely coveted. The fluid was removed from the sac by a small iron tool and applied to cloth. When exposed to sunlight, the cloth became, in turn, green, blue, red, purple, and finally, when thoroughly washed, a bright crimson. From no Mediterranean region other than Phoenicia was such exquisite dye obtained. The Phoenicians also manufactured fine glass, the secret of which they had learned from Egyptians and applied to all manner of objects such as bowls, cups, vases, and bottles. They were skillful weavers, manufacturing splendid woolens, linens, silks, and embroideries. Searching for precious metals, they became successful miners and were famed for their excellent craftsmanship in bronze, silver, and gold. Objects made from these materials were eagerly purchased throughout the world. The process of cutting gems and carving ivory received much attention in Phoenicia, and sculpture in stone attained great excellence.

COLONIES AND COMMERCE. As their economic life expanded, the merchants of Phoenicia wandered farther and farther from home. By 800 B.C., Phoenician trading colonies dotted the islands and shores of the Mediterranean. Among the trading centers were Palermo and Syracuse in Sicily, Malta on the island of that name, and Malaga and Cadiz in Spain. The most renowned was Carthage on the African coast, a

MAP VI.—Philistines, Phoenicians, and Hebrews, 1000 B.C.

prosperous city founded about 800 B.C., which soon became a military power, extending its sway over northern Africa, Sicily, Sardinia, and Spain. Phoenician merchants sailed beyond Cadiz as far as the Cassiterides (Scilly Isles), or "tin islands," off Cornwall in England, whence they brought tin, a metal indispensable for the manufacture of bronze.

The Phoenicians were a hard-working and practical people. Just as agriculture had once revolutionized man's habits, so industry and trade now were profoundly changing man's ways of thinking and acting, and the Phoenicians led in this commercial and industrial activity. Small wonder that Homer stood in awe of their craftsmanship! The economically backward Greeks could not quite approve their slippery dealings. They were suspicious of the Phoenicians, "men famed for their ships, greedy knaves, who bring countless trinkets in their black ships."

INVENTION OF THE ALPHABET. The practical character of the Phoenicians is best illustrated by an invention which we use every day and which so well serves the needs of the modern world that there is little chance of its ever being discarded—the alphabet. We have seen how man at the dawn of history first conveyed ideas by means of picture writing, a cumbersome method that developed in various places apparently quite independently. In Egypt, syllabic writing and, later, alphabetic writing came into existence; but the twenty-four hieroglyphic signs still remained pictures. In Sumer and Babylonia, picture writing also came into existence. One had to learn about five hundred and sixty signs, each of which stood for a syllable, if he wanted to express all his ideas.

Because these cuneiform signs were cumbersome, practical traders in the cities of the Fertile Crescent invented an alphabetic system. Just how they did this is difficult to explain; but it is known that Semitic traders in the Sinai Peninsula adapted the Egyptian signs acquired from their business contacts with Egypt. These signs were readily taken over by the Phoenicians in the thirteenth century B.C. and developed into an alphabet of twenty-two signs, omitting the vowels. Further, they borrowed from the Egyptians the habit of writing on papyrus with ink made from vegetable juices and applied by a stylus. This method was more practical than that of the Babylonians, who had to bake the soft clay so as to render their tablets permanent.

The Phoenicians apparently were the first to arrange the letters in a fixed order. The first letter was named *aleph* (ox), the second *beth* (house). Later, the Greeks, who borrowed the Phoenician letters, imitated the Phoenician sounds and called them *alpha*, *beta*, and so forth. From the names of the first two letters was derived our word "alphabet." Other influences besides the Phoenician contributed to the formation of the alphabet, but there is not much certainty about them. Whatever their origins, the alphabet, the use of papyrus, and writing with pen and

ink were basic achievements without which civilization would surely have had a very different development.

THE ARAMAEANS. The Aramaeans, another people speaking a Semitic language and hence related to the Phoenicians in speech and customs, now appear in history. Originally they too were nomadic shepherds who about 1400 B.C. had crowded into the Fertile Crescent

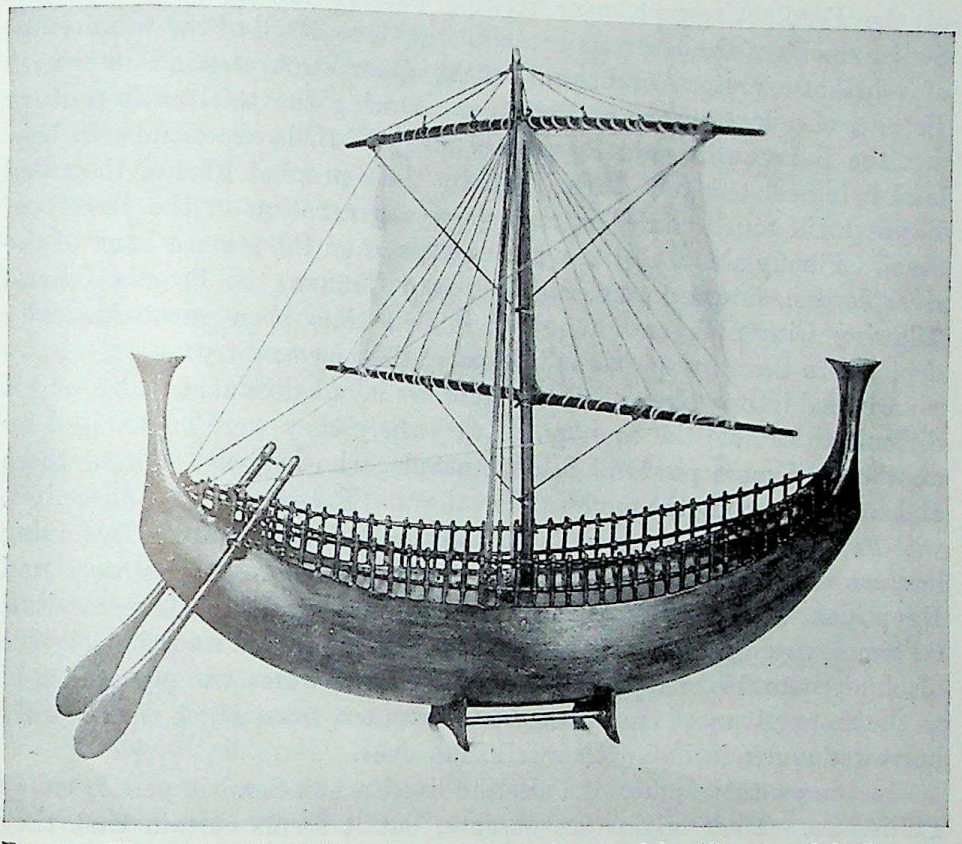


FIG. 19.—Phoenician ship, thirteenth century B.C., from model. (*Courtesy of the Commercial Museum, Philadelphia.*)

and by 900 B.C. occupied the region around Damascus, which became their chief center.

The Aramaeans, who formerly had used the cumbersome cuneiform syllabic writing in clay tablets borrowed from Babylonian civilization, took over the reformed alphabet of the Phoenicians. Their caravans carried its use far and wide, particularly to the east. The inhabitants of Mesopotamia, Persia, and even India adopted it, but with many modifications. The Aramaean tongue, in the northern parts of the Fertile Crescent and in Babylonia, displaced the other Semitic forms so that it became a common language for all classes. In Palestine, it actually displaced the Hebrew tongue, and thus Jesus and his disciples spoke Aramaic.

HEBREWS, CANAANITES, AND PHILISTINES. Next we must consider the Hebrews, whose contribution to civilization is of the utmost importance because one of their groups, the Israelites, contributed important elements to the Christian religion. The Hebrews, like the Phoenicians and Aramaeans, spoke a Semitic language, dwelt in the desert, and were nomadic and pastoral. Poor and miserable, they wandered at the edge of the Fertile Crescent, ever seeking pasture for their flocks. The earlier stories of the Hebrews contained in Genesis tell of the wanderings of a distant ancestor Abraham along the upper Euphrates in Sumer near Ur and also in Canaan, or Palestine. During the thirteenth century B.C. the Hebrews lived in Egypt, the story of their experiences in that land being related in Exodus. Led by their prophet Moses, they fled Egypt amid much confusion and spent a generation in the Desert of Sinai. Finally about 1150 B.C. they appeared on the eastern bank of the river Jordan, intent on crossing over into Canaan, the Promised Land "flowing with milk and honey." It had thus been enthusiastically depicted to them by spies sent to explore the new country.

Divided into twelve tribes, the Hebrews invaded Canaan but found it difficult to subdue the country. Everywhere they were confronted by another and more powerful Semitic people, who long ago settled there and were occupying the more fertile valleys. These were the Canaanites, who had made great progress in agriculture, industry, and trade, having learned many cultural lessons from the Phoenicians to the west and Egyptians to the south. From the Phoenicians, they had received religious customs, especially the licentious rites of Baal and the sacrifice of children to Moloch. The pastoral Hebrews were strongly attracted to the more advanced culture of the Canaanites, from which they readily borrowed much, including their religious ideas.

In the southern parts of Palestine lived a non-Semitic people called Philistines. Their origins are obscure, but it seems certain that they were related to the inhabitants of Crete, whose cultural achievements will be described in Chap. IX. Decidedly superior in culture to the Hebrews and even to the Canaanites, the Philistines imposed political and military control upon them. After long struggles the loosely organized Hebrew tribes united to overthrow the Philistines and formed a state under King David (1000?–955 B.C.), who made Jerusalem his capital. He was succeeded by his son Solomon (*d.* 935 B.C.), who tried to rule like the great kings about him, imitating their magnificence. He built a sumptuous residence for himself and a splendid temple for Jehovah, the God of the Hebrews. He also imported from the east the custom of keeping a harem. Such was the discontent engendered by the burden of taxation that on his death the realm was divided, the northern part being known as Israel. This state continued its independent existence until 722 B.C.,

when it was conquered by Sargon II, King of Assyria. The southern part, called Judea, maintained its separate status until King Nebuchadnezzar of Chaldea, or New Babylonia, seized it in 586 B.C.

PHOENICIAN AND CANAANITE RELIGION. Like the Canaanites, to whom they were closely related, the Phoenicians had moved into Palestine and Syria during the Bronze Age, when agriculture provided the chief means of subsistence. Their religion was concerned mainly with the mysterious processes of nature, which gave them plants and animals for food. Their gods were fertility gods, associated with trees, fields, rivers, and springs. They were sometimes worshiped in temples but more often on hills. A local god called Baal (plural, *Baalim*) might be male or female. The Phoenicians of Tyre worshiped a male Baal called Melkarth. Ashtoreth, a female divinity, was venerated everywhere. She appears to have been essentially the same as the Earth Mother goddess, whose influence over the productive powers of nature made her popular in many places in western Asia. The name Ashtoreth, it should be noted, is merely another form of Ishtar, the goddess whose worship was common in Babylonia. The cult of Ashtoreth throve in many cities of Phoenicia and spread to Cyprus, an island to the west in the Mediterranean Sea whence the Phoenicians secured quantities of copper. The Greeks received their goddess Aphrodite, or Venus, from Cyprus; she apparently was the same as Ishtar and Ashtoreth.

Two striking religious practices obtained among the Phoenicians and their Canaanite kin. These reveal to what depths a religion that consists essentially in a worship of the deified forces of nature may decline. First of these was the sacrifice of children, especially first-born. The fierce god Moloch, repeatedly referred to in the Old Testament, required the immolation of children. The second was religious prostitution, which appears to have been so common that Moses expressly forbade it among the Israelites (Deut. 23: 18). Such revolting and inhuman practices show that it is difficult to base lofty ethical conceptions upon the deified forces of nature, especially in their sexual aspect.

HEBREW RELIGION: MONOTHEISM. Like other Semites, the Hebrews did not create many arts of civilization; in general, they found most of these already well developed by the people among whom they settled. One significant contribution, however, was made by the Israelites. They were the only people at this time to work out many ideas logically involved in monotheism, the belief that there is only one God. Monotheistic belief was by no means limited to the Israelitic Hebrews; some primitive peoples had religions that were strongly monotheistic. Even when peoples believed in a plurality of gods, they often worshiped a great creator god who had brought into being the host of lesser gods and who exercised sovereignty over them.

This is not to say that Israelitic Hebrews always were strict monotheists. Like other Semitic dwellers of the desert, they sometimes paid worship to other gods. If they did not honor them, they nevertheless regarded them as the "gods of other people." Abraham, Isaac, and Jacob, important leaders in early Hebrew history, were undoubtedly monotheists; but their ideals were as yet beyond the conception of their people. The principles of monotheistic religion were brilliantly advocated by the prophet Moses while the Jews were dwelling in the Desert of Sinai. The tables of the law, which date from his time, stated explicitly, "Thou shalt have no other gods before me" (Exod. 20: 3). Jacob showed himself a firm monotheist. "Then Jacob said unto his household, and to all that were with him, Put away the strange gods that are among you, and be clean and change your garments: . . . And they gave unto Jacob all the strange gods which were in their hand, and all their earrings which were in their ears . . . " (Gen. 35: 2, 4). Nowhere is this uncompromising monotheism better stated than in the opening passages of the Book of Genesis. "In the beginning God created the heaven and the earth." In other creation stories, especially the Babylonian, the creator god usually has an encounter with rival gods and must defeat them in order to achieve creation. In the Hebrew account we are simply told that God created the heaven and the earth from *nothing*.

It is important to grasp the significance of the higher ethical monotheism that appeared among the Hebrews, especially after the year 1000 B.C. Older religions that derived from the Neolithic and Bronze ages were so closely associated with nature that they could not be separated from it. For generations, Egyptians had associated Osiris, Isis, and Ra with the vegetation of the Nile Valley and with the sun, which nurtured it. In other places, particularly the Tigris-Euphrates Valley, man had long viewed the succession of the seasons as due to the relation of the divine lovers Tammuz and Ishtar. The Earth Mother goddess Ishtar was the goddess of agriculture and mother of the harvest and therefore the patroness of civilization. Spring and summer were the happy months of her mating with her lover Tammuz. Autumn and winter were the time of Tammuz's dying and disappearance into the nether world. Only when Ishtar appeared in the underworld and persuaded the god who ruled over the nether regions to let Tammuz be awakened from death's sleep could the divine lovers be reunited, spring return, vegetation flourish, crops ripen, and man and beast secure the food they needed.

Wherever man had learned to make a livelihood from cattle raising or agriculture, he was likely to deify the reproductive forces of nature. Such religious ideas were expressed in ritual songs, dances, and ceremonies. Rulers like the Pharaohs of Egypt were deified, and the whole

cultural organization was regarded as divine or at least as instituted by the gods themselves. This type of religion lasted until the opening of the first millennium B.C. Most ancient communities like Egypt and Babylonia then passed through severe social and political crises that shook them to their foundations. The old nature religions so closely associated with the life of such communities were severely tested. It seemed difficult to dissociate divinity from the agricultural and civilized life of a community.

The Hebrews were the first to teach that a universal moral law governed the world of man, a moral law not identified with this world but existing as a separate principle before the world had come into being. By it all things were to be adjudged right or wrong. The moral law of justice and truth was an expression of Jehovah's will, and all mankind was required to submit to it. This indeed was novel teaching, the great contribution of the Hebrews to the history of civilization. It exerted an incalculable influence in shaping the moral and religious sentiments of the later Greeks and Romans and of the Europeans of medieval and modern times.

JEHOVAH, ISRAEL, AND THE COVENANT. The God of the Hebrews was called Yahweh; but because our medieval forefathers did not understand Hebrew, this name was changed to Jehovah, which is equivalent to "God." This usage is now so general that many writers refuse to drop it for the more correct Yahweh. Jehovah stood in a special relationship to the Hebrews, who regarded themselves as his chosen people. The word "Israel" is used to denote this special and elect people. Another idea peculiar to Hebrew religion was that of a "covenant" made between Jehovah and Israel. The covenant consisted in a series of promises by Jehovah to the children of Israel, of whom implicit loyalty was required under all conditions. This idea of a chosen people and a covenant with Jehovah constituted a profoundly significant religious influence, molding Hebrew life and thought and preventing Hebrew culture from being absorbed by that of more powerful neighbors.

PROPHETS. Hebrew monotheism differed from other religions in that it centered in prophets and not to any great degree in priests. A prophet was moved by Jehovah to proclaim his message and reveal his will. A prophet therefore spoke for Jehovah; foretelling the future was only a secondary function. Priests interceded with Jehovah for the people, but the voice of the prophet came directly from Jehovah and so had greater authority. Hebrew prophets were far more august figures than the priests; they frequently came forward in national disasters to thunder against idolatry and immorality, proclaim that Jehovah would not forsake his chosen people, and tell of a future blessed time when righteousness would reign. Thus Jeremiah wrote:

Behold, the days come, saith the Lord, that I will make a new covenant with the house of Israel, and with the house of Judah: . . . After those days, saith the Lord, I will put my law in their inward parts, and write it in their hearts; and will be their God, and they shall be my people. And they shall teach no more every man his neighbour, and every man his brother, saying, Know the Lord: for they shall all know me, from the least of them unto the greatest of them, saith the Lord: for I will forgive their iniquity, and I will remember their sin no more [Jer. 31: 31–34].

This predicted future was to witness the coming of the Messiah, who would establish a blessed era. Thus Isaiah:

And there shall come forth a rod out of the stem of Jesse, and a Branch shall grow out of his roots: And the spirit of the Lord shall rest upon him, the spirit of wisdom and understanding, the spirit of counsel and might, the spirit of knowledge and of the fear of the Lord; And shall make him of quick understanding in the fear of the Lord: and he shall not judge after the sight of his eyes, neither reprove after the hearing of his ears: But with righteousness shall he judge the poor, and reprove with equity for the meek of the earth: and he shall smite the earth with the rod of his mouth, and with the breath of his lips shall he slay the wicked. And righteousness shall be the girdle of his loins, and faithfulness the girdle of his reins [Isa. 11: 1–5].

The Hebrew Scriptures. The teachings, exhortations, prophecies, and religious experiences of the Hebrew peoples are contained in the books of the Old Testament. These are thirty-nine in number[1] and constitute a small library of some of the most significant literature ever created. The first five of these books, collectively called the Pentateuch, are ascribed to the prophet Moses, who led the Hebrews out of their Egyptian bondage and guided them during their sojourn in the desert. In what manner Moses was the author of the Pentateuch or gave these writings their final form is not clear. Genesis is a noble piece of literature, telling in simple language the Hebrew story of creation, the covenant of Jehovah with his chosen people Israel, and the early history of the Hebrew people. Exodus contains the Ten Commandments pronounced in the name of Jehovah and setting forth the severe and universal principles of morality, which to this day are justly admired and accepted as basic. The Book of Exodus also describes in great detail the ceremonies of the Hebrews, by which their religious life was guided. The other books of the Pentateuch—Leviticus, Numbers, and Deuteronomy—give much additional information about the laws regulating their religious and legal life.

[1] This is the number contained in the King James Version. During the early history of the Christian church and throughout the Middle Ages and modern times, seven other books were included in the Old Testament. These are Tobit, Judith, Wisdom of Solomon, Ecclesiasticus, Baruch, and 1 and 2 Maccabees. They are found in the Douay Bible.

After the Pentateuch come a number of historical books—Joshua, Judges, Ruth, Samuel, Kings, and Chronicles—deeply impregnated with religion. They also contain much excellent historical material. In fact, no other historical writing before the days of Herodotus can compare with them in dignity, human interest, and the portrayal of the spiritual experiences of a people. The Hebrews were the first people to develop a historical literature. Their belief that they were Jehovah's chosen people, children of the covenant, produced in them a conviction that they were a people apart from others. This fact alone colored their political experiences; it gave their history a special significance. For history was but the hand of Jehovah in the affairs of man.

Particularly splendid are the prophetic books. These are divided into two groups—the Major and the Minor Prophets. The prophets were moral reformers, religious teachers, and political advisers. Chief among the Major Prophets is Isaiah, who exhorted the Hebrews to live righteously and denounced the corruptions of the priests. Neither in sacrifices nor in empty formal observances does righteousness consist, but in upright conduct.

To what purpose is the multitude of your sacrifices unto me? saith the Lord: I am full of the burnt offerings of rams, and the fat of fed beasts; and I delight not in the blood of bullocks, or of lambs, or of he goats. Bring no more vain oblations; incense is an abomination unto me; the new moons and sabbaths, the calling of assemblies, I cannot away with; it is iniquity, even the solemn meeting. . . . Wash you, make you clean; put away the evil of your doings from before mine eyes; cease to do evil; Learn to do well; seek judgment, relieve the oppressed, judge the fatherless, plead for the widow. Come now, . . . saith the Lord: though your sins be as scarlet, they shall be as white as snow; though they be red like crimson, they shall be as wool [Isa. 1: 11–18].

Jeremiah's prophecies contain pathetic lamentations about his people's sins and their faithlessness toward Jehovah.

O Jerusalem, wash thine heart from wickedness, that thou mayest be saved. How long shall thy vain thoughts lodge within thee [Jer. 4:14]?

The word "jeremiad" perpetuates the memory of this great prophet and the pessimistic note that characterizes his utterances. Ezekiel prophesied in eloquent strains the glorious future of a chosen people restored from the Babylonian captivity in 586 B.C.

The Minor Prophets are no less interesting. Amos, the fierce shepherd, preached a lofty ideal of social righteousness.

Forasmuch therefore as your treading is upon the poor, and ye take from him burdens of wheat: ye have built houses of hewn stone, but ye shall not dwell in them: ye have planted pleasant vineyards, but ye shall not drink wine of them.

For I know your manifold transgressions and your mighty sins: they afflict the just, they take a bribe, and they turn aside the poor in the gate from their right. . . . Seek good, and not evil, that ye may live: and so the Lord, the God of hosts, shall be with you, as ye have spoken. Hate the evil, and love the good, and establish judgment in the gate: it may be that the Lord God of hosts will be gracious unto the remnant of Joseph [Amos 5: 11–15].

Equally impressive are the prophecies of Hosea, Micah, and Malachi. Announcing "the burden of the word of the Lord to Israel," Malachi complains of his people's unkindness toward Jehovah, who surely will punish them for their faithlessness.

For, behold, the day cometh, that shall burn as an oven; and all the proud, yea, and all that do wickedly, shall be stubble: and the day that cometh shall burn them up, saith the Lord of hosts, that it shall leave them neither root nor branch. But unto you that fear my name shall the Sun of righteousness arise with healing in his wings; and ye shall go forth, and grow up as calves of the stall. And ye shall tread down the wicked; for they shall be ashes under the soles of your feet in the day that I shall do this, saith the Lord of hosts. Remember ye the law of Moses, my servant, which I commanded unto him in Horeb for all Israel, with the statutes and judgments. Behold, I will send you Elijah the prophet before the coming of the great and dreadful day of the Lord: And he shall turn the heart of the fathers to the children, and the heart of the children to their fathers, lest I come and smite the earth with a curse [Mal. 4].

As a masterpiece of religious philosophy, the Book of Job is unsurpassed, though the theme is a common one rising from the contradictions experienced in everyday life. It depicts the feelings of Job, who, once rich, lost his family and possessions and was physically afflicted with boils. Because he had always been "a perfect and an upright man, one that feareth God, and escheweth evil," these misfortunes appeared incomprehensible to Job and his friends; but he remained steadfast, trusting God, who in the end did not desert him.

Finally must be mentioned the Psalms, 150 in number. They are ascribed to David, although most of them are not from his hand. One of them, Psalm 23, finely expresses abiding trust in Jehovah. Psalm 24 proclaims Jehovah's sovereign power and his ethical demands.

The earth is the Lord's and the fulness thereof; the world, and they that dwell therein. For he hath founded it upon the seas, and established it upon the floods. Who shall ascend into the hill of the Lord? or who shall stand in his holy place? He that hath clean hands, and a pure heart; who hath not lifted up his soul unto vanity, nor sworn deceitfully. He shall receive the blessing from the Lord, and righteousness from the God of his salvation. This is the generation of them that seek him, that seek thy face, O Jacob. . . . Lift up your heads, O ye gates; and be ye lifted up, ye everlasting doors; and the King of glory shall come in. Who is this King of glory? The Lord strong and mighty,

the Lord mighty in battle. Lift up your heads, O ye gates; even lift them up, ye everlasting doors; and the King of glory shall come in. Who is this King of glory? The Lord of hosts, he is the King of glory. . . . [Ps. 24].

THE EXILE. The period of the Exile witnessed an outburst of great religious ardor among the Hebrews. Many of the Israelites who had been deported after the capture of Samaria in 722 B.C. by the Assyrians were lost so far as the future history of the Hebrew peoples was concerned. These ten "lost tribes" were absorbed by the population of the Tigris-Euphrates Valley. But the two tribes of Benjamin and Judah carried off by King Nebuchadnezzar to Babylon in 586 B.C. never completely amalgamated with the peoples living in Chaldea. Some, no doubt, were absorbed by their neighbors, but many remained faithful to their religion, read the sacred books, and prayed to be restored to Judea, to the Promised Land that Jehovah through his prophet Moses had set apart for them to live in. Psalm 137 is an echo of their ardent hope:

By the rivers of Babylon, there we sat down, yea, we wept, when we remembered Zion. We hanged our harps upon the willows in the midst thereof. For there they that carried us away captive required of us a song; and they that wasted us required of us mirth, saying, Sing us one of the songs of Zion. How shall we sing the Lord's song in a strange land? If I forget thee, O Jerusalem, let my right hand forget her cunning. If I do not remember thee, let my tongue cleave to the roof of my mouth; if I prefer not Jerusalem above my chief joy. Remember, O Lord, the children of Edom in the day of Jerusalem; who said, Rase it, rase it, even to the foundation thereof. O daughter of Babylon, who art to be destroyed; happy shall he be, that rewardeth thee as thou hast served us. Happy shall he be, that taketh and dasheth thy little ones against the stones. [Ps. 137.]

THE SYNAGOGUE. The exiles longed for a delivering Messiah; and the prophet Ezekiel, in his visions, shows that the old religious spirit of the Hebrews was far from dead. Their religious life was centered in the synagogue, a meetinghouse for prayer and religious instruction. Wherever the Hebrews went, even down to our own day, they took this remarkable institution with them. When Cyrus, the Persian king who had overthrown the Babylonian Empire, issued a decree in 538 B.C. permitting the Hebrews to return to Judea, a small but select group of zealous people who had clung to their ancient faith went back to Jerusalem. Here they again erected the Temple and reestablished their ancient worship.

HEBREW CONTRIBUTION TO CIVILIZATION. Hebrew monotheism became the cornerstone of the Christian faith, the synagogue the predecessor of the Christian church, and the Messiah the Christian Christ. The Hebrew faith also profoundly influenced Mohammedanism. The morality of the Hebrews, based upon the uncompromising monotheism

of their prophets, became part and parcel of the lives of Christians. It provided them with basic ideas about moral obligation, the nature of this life.

Our consideration in this chapter of new cultural factors—the invention of the alphabet and the monotheistic faith of the Hebrews—closes this survey of Near Eastern civilization for the moment. Although the people of Egypt and the Tigris-Euphrates Valley and some of their neighbors maintained the high excellence of their culture and even made noteworthy contributions to it, leadership in civilization passed to Indo-European peoples who came from the north, crowding into lands bordering on the Mediterranean and into the Fertile Crescent. The migrations and early cultural achievements of these peoples form the subject of the following chapter.

FOR FURTHER READING

Baikie, James: *The Amarna Age*
Barton, G. A.: *A History of the Hebrew People*
Baynes, N. H.: *Israel among the Nations*
Cheyne, T. K.: *Jewish Life after the Exile*
Childe, V. G.: *Dawn of European Civilization*
James, Fleming: *Personalities of the Old Testament*
MacCurdy, G. G.: *Human Origins*, Vol. II
Margolis, M. L., and Alexander Marx: *A History of the Jewish People*
Noyes, C. E.: *The Genius of Israel*
Old Testament, The: The Douay Bible is recommended because it contains more of the sacred books than the King James Version
Olmstead, A. T. E.: *History of Palestine and Syria to the Macedonian Conquest*
Peake, H. J., and H. J. Fleure: *The Corridors of Time*, Vol. IX
Rawlinson, George: *Phoenicia*
Rickard, T. A.: *Man and Metals*, Vol. I
Sprengling, Martin: *The Alphabet: Its Rise and Development from the Sinai Inscriptions*
Ullman, B. L.: *Ancient Writing and Its Influence*

Chapter VII

MIGRATIONS OF INDO-EUROPEAN PEOPLES. THE PERSIANS AND THEIR CULTURE

Myth contains germs of the future epic, romance, and tragedy; and it has been used in them by the creative genius of peoples and by the conscious art of civilization.—Bronislaw Malinowski

OUR attention now turns to the Indo-European peoples inhabiting the steppes and loesslands of Europe and Asia, who during the third millennium B.C. invaded the agricultural regions of the Mediterranean, the Fertile Crescent, and the Indus Valley. About the year 2000 B.C. the drama of human activity assumed a more rapid tempo as many peoples abandoned their ancient lands and sought new and distant homes. The stage is more spacious, the historical drama becomes more complex and difficult to follow. The outcome of this activity is the displacement of the old centers of civilization in the Nile and the Tigris-Euphrates valleys in favor of more northern lands and new leaders from Persia, Greece, and Rome.

The region of the steppes, where these new peoples originated, extended eastward from the Rhine and Danube across southern Europe through Central Asia as far as the Altai Mountains. The northern limits of this vast region three thousand miles in length were formed by the timber belt along the fiftieth parallel. The southern limits were marked by the Black and the Caspian seas, the Caucasus, Elburz, and Hindu Kush mountains, The Pamirs, Tien Shan and Altai Mountains.

In Europe some of the soil of the steppe regions had been formed by wind-blown dust, called loess, from the retreating glaciers of Mousterian times in the Paleolithic Age. Other soil was even more slowly formed from water-carried particles deposited in the many river valleys. Part of these regions originally formed the floor of seas and inland lakes. In Central Asia between the Caspian Sea and the Altai Mountains the country was composed of shifting desert sand. Here and there, especially in Turkestan, it was interspersed with fertile lands suitable for agriculture. To the north up to the timber belt lay a broad stretch of green grazing land.

The loess soils of Europe and the green steppes were uniquely adapted to cattle raising, and a nomadic pastoral life naturally grew up. Even the sandy wastes of parts of Turkestan provided pasture during the

Map VII.—Eastern European and Asiatic hinterlands.

rainy weeks of spring and autumn. In the third millennium B.C. Turkestan was not nearly so devoid of rainfall as at the present time. From these vast regions between the Danube River and the Altai Mountains emerged various groups of peoples speaking Indo-European languages.

For long periods during the Neolithic Age, life seems to have remained stagnant on the steppes. But as the Neolithic Age advanced, conditions changed profoundly; agriculture and cattle raising supplanted hunting, and commercial relations became more regular. Evidences of most of this cultural progress have been lost, but that it was brilliant is proved by the remains left by the builders of the megalithic monuments which dot the Russian steppes. Technological elements were introduced from the south, that is, from the Nile and Tigris-Euphrates valleys. The superior civilization of these southern lands was an irresistible attraction to the peoples living on the fields and steppes of Europe and Asia. Just as the Semitic nomads of the Arabian Desert moved into the Fertile Crescent and the Nile Valley, so did the peoples of the north seek homes among the culturally more advanced dwellers of the south. The plains of Turkestan north of the Elburz and Hindu Kush Mountains and the coastal regions of the Black Sea were the areas through which Indo-European peoples moved southward into Persia and the Fertile Crescent. They also came by way of the Dardanelles, the Bosporus, and the islands of the Aegean Sea. But their migrations were confusing, and the historian can scarcely trace them chronologically.

The Indo-European Languages. The earlier history of the Indo-European peoples and their languages is wrapped in the darkest obscurity, and it is only with great patience that scholars have ascertained the most general facts. About a century and a half ago, it was noted by the first European students of Sanskrit, the ancient Aryan language of India, that its words and syntax were closely related to Greek, Latin, and German. This similarity is illustrated by a few words in the following table:

Sanskrit	Greek	Latin	German	English
pitar	pater	pater	Vater	father
matar	mater	mater	Mutter	mother
bhratar	phrater	frater	Bruder	brother
duhitar	thugater	.....	Tochter	daughter

Jakob Grimm. The fact that many of the languages spoken throughout the region from the shores of the Atlantic to India seemed to be related moved scholars to seek an explanation for this similarity. Jakob Grimm (1785–1863), a famous German student of literature, language,

and folklore, made a study of the subject, drawing upon the investigations of previous scholars. He published a *German Grammar* in 1822, showing systematic correspondences between the consonants of Germanic and other Indo-European languages. Grimm's statement of these consonantal changes become known as Grimm's law. The underlying theory of the law is based on the assumption that once there had been a common Indo-European language, which disappeared long before the dawn of history. Its oldest offshoot in all probability is Sanskrit, whose word forms, it is believed, more closely resemble those of the original Indo-European tongue than do those of the other daughter languages. Grimm showed that nine consonantal sounds in the original Indo-European language systematically changed to other consonantal sounds in the various Indo-European languages. These sounds are as follows:

Sounds	Labials	Dentals	Palatals
Voiceless stops	*p*	*t*	*k*
Voiced stops	*b*	*d*	*g*
Aspirated voiced stops	*bh*	*dh*	*gh*

The Indo-European voiceless stops *p*, *t*, and *k* became voiceless aspirants *f*, *th*, and *h*, respectively, in Germanic languages; the voiced stops *b*, *d*, and *g* become voiceless stops *p*, *t*, and *k*, respectively; and the aspirated voiced stops *bh*, *dh*, and *gh* became voiced stops *b*, *d*, and *g*, respectively, as illustrated by the following examples:

Sounds	Sanskrit	Greek	Latin	German or English
Voiceless stops:				
p	pād	póda	pedem	foot
t	tri	treis	treis	three
k	cunas (of a dog)	kuōn	canis	hound
Voiced stops:				
b	.....	turbē	turba	thorp
d	dva	dúo	duo	two
g	jānu	gónu	genu	knee
Aspirated voiced stops:				
bh	bher	pherō	ferō	bear (carry)
dh	dvār	thura	foris	door
gh	hansa	chēn	anser	Gans (goose)

Another name for the phenomenon that Grimm's law describes is the "Germanic consonant shift," for it is the first systematic shifting of consonantal sounds that separated the Germanic languages as a distinct

linguistic group from other offshoots of the parent Indo-European tongue. It should further be noted that where the sibilant *s* appeared with *p*, *t*, or *k* the latter remained unchanged. The liquids *l*, *m*, *n*, and *r* also remained the same in the daughter tongues. Vowel sounds, however, underwent constant change. Finally, as the language groups diverged more and more and met with novel conditions, additional changes came about in vocabulary and structure. Grimm's discoveries were important, for they showed a relationship among most of the languages of Europe, Persia, Armenia, and India that had never been suspected before the eighteenth century.

Who were the first hypothetical Indo-Europeans? There has been much unprofitable controversy on this point, and great misunderstanding has arisen. It has been assumed that some people originally spoke a parent Indo-European language and that the various Indo-European languages developed when groups separated from the parent stock and lived under different conditions. Further, it has been found that certain people speaking Indo-European languages are tall and longheaded and have light or red hair. This physical type can be shown to go back to Neolithic times. To assume, however, that there is a relationship between tall, blond folk, or "nordics," and Indo-European languages is a serious mistake. Race and language or race and any other cultural trait have little or nothing to do with each other. A good example of the scientific impossibility of holding to a racial theory of language is furnished by the Athapascan tongue spoken by most of the Indians of northwestern Canada. A small group of Indians in southern Oregon and another inhabiting a few villages at the mouth of the Columbia River also speak this language. These Indians represent a fairly consistent physical type. But the Athapascan language is spoken also in Arizona and New Mexico by Indians of a very different physical type.

The first Indo-European language may have been spoken in Paleolithic times, for few elements of culture are more persistent than language. Words in everyday usage like mother, father, brother, stand, sleep, and eat cannot easily be lost even though they undergo changes. Some of the commonest words we use undoubtedly were spoken in some form by our paleolithic forebears. The various Indo-European languages have similar words for dog, sheep, goat, cow, horse, milk, fat, grain, plow, furrow, yoke, and bread. These words imply a neolithic cultural complex based upon agriculture and cattle raising.

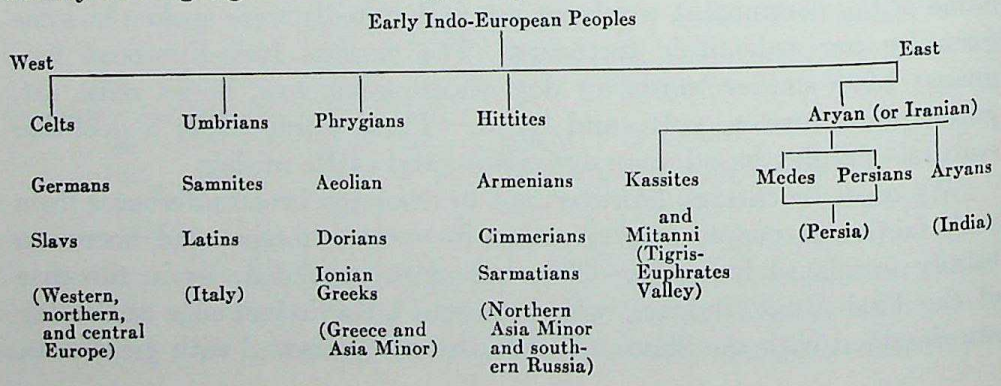
We must be careful, however, not to draw too broad inferences from such facts. A people may abandon its mother tongue and borrow a totally unrelated language. This has often been done as in the case of the Ural-Altaic Bulgars, who borrowed a Slavic language and today are classified with the Slavs. Words also are borrowed with great ease.

The word "tobacco" is an instructive example. The use of tobacco spread among Europeans after the conquest of Mexico by Cortes (A.D. 1520), and with it also went the word. Hence we have the various European forms, as tobacco, *tobaco*, *tabac*, *tobak*, and *tabak*. The Yakima Indians in the state of Washington long before they had any contact with white men also borrowed the word when they imported tobacco, calling it *tawach*.

Language, therefore, is a cultural trait that spreads by diffusion, sometimes over vast distances. For example, it has recently been shown that the Athapascan Indian language is distantly related to languages spoken by certain mongoloid peoples of northern Asia. When and how diffusion of this language from Asia to America took place is unknown, though it was probably many thousands of years ago. We must admit frankly that because languages pass by diffusion from people to people it is more or less futile to speculate about the "primitive home" of the "first Indo-European race." Some have argued that this primitive home was in Central Asia, some that it was in southern Russia, and, others recently, that it was in the Danube Valley.

Indo-European Migrations. Shortly after 3000 B.C. began a great wandering of Indo-European peoples living on the grasslands of southern Europe and Central Asia. These movements, like the Semitic migrations into the Fertile Crescent and Egypt, must be reckoned among the important events of history. For these migrations, continuing more than 3,000 years, were to make much of Europe and Asia Minor as well as Persia and northern India related, at least in language. They blocked the further expansion of Semitic peoples by occupying the lands to the north and east that might otherwise have become Semitic in language as in the case of Sumer, Assyria, and even Carthage. To our day, most of this vast region stretching from the Atlantic coast eastward to the plains of the Ganges, embracing Europe and large parts of Asia, has remained Indo-European in language.

The following diagram will simplify the history of the Indo-European family of languages and the migratory movements of these peoples:



THE HITTITES. Among the first to move into southern lands were a group of tribes called Hittites, who crowded into Asia Minor (see map and preceding table). They established a powerful state in the region between Phrygia and the Armenian highlands southward to the Taurus Mountains. It is impossible to distinguish between the original population of these regions and the new arrivals, nor can much be said about the institutions and internal history of these people.

It was not known that the Hittites spoke an Indo-European language until an archaeologist in 1917 discovered proof of this in hieroglyphic and cuneiform inscriptions on some official tablets of the Hittite government found at Boghazkeui. For example, the Hittite word for water was *vadar*—how like the Greek *hudor* and our own "water"! Further, the names of Hittite leaders and their gods often had a strangely familiar Indo-European sound. In all probability, therefore, the original Hittites moved from the grasslands of the north into this region by way of the Black Sea coast, subjecting the native population and mingling with them.

The Hittites were a military people, breeding great numbers of horses for war and manufacturing weapons of iron. Khatti, their largest city, had walls of massive stones carefully put together and strengthened at intervals with towers and impregnable gates; it was essentially a fortress. The Hittites became an important power in western Asia, often assuming a dominating position and dictating to Egypt, Assyria, and the Hebrews. After Hittite power collapsed about 1200 B.C., some groups continued their old life, but in the south they fell under the rule of Assyria and Chaldea and, finally, Persia.

THE MITANNI. Other peoples speaking Indo-European languages moved from Turkestan before 2000 B.C. and appeared in the plains of the Fertile Crescent. These were the Aryans, or Iranians, who gave their name to the Iranian, or Persian, Plateau. Among these folk were the Mitanni, a powerful people possessing large numbers of horses. They extended their authority over the lands along the upper Euphrates and, like the Hittites, formed a ruling aristocracy of Indo-Europeans among the Semites and other people of that region. So like the Hittites were they that they are often confused with them. Together with the Hittites they created much confusion in the Tigris-Euphrates Valley and even sacked Babylon in 1926 B.C. However, because they worshiped such Aryan gods as Indra and Varuna, we know that they were Aryans.

THE KASSITES. The Kassites, another vigorous Aryan folk like the Mitanni, crowded over the Kurdistan highlands and Zagros Mountains to settle in the fertile lands of the Tigris-Euphrates Valley. A rude highland folk, they seized the government of Babylonia about 1750 B.C. and put an end to the great state of Hammurabi. Like the Mitanni,

the Kassites settled among their Semitic subjects, from whom they acquired ideas of higher culture. Gradually they lost their identity, becoming in every way assimilated with the Semitic peoples they conquered. With the passing of their culture, the Kassites are particularly remembered for introducing the large-scale use of the horse into the Fertile Crescent.

Armenians, Cimmerians, Scythians, and Sarmatians. The Armenians, a group of Indo-European peoples distantly related to the Hittites, established themselves around Lake Van and in the southern Caucasus Mountains, where they still live. Their movements were probably similar to those of other Indo-European peoples who continued to inhabit the steppes of southern Russia, such as the Cimmerians, Scythians, and Sarmatians. The Cimmerians were a nomadic people who rode and milked horses, lived in wagons, and were formidable in war. They also had contacts with the Tigris-Euphrates Valley and were the agents of cultural diffusion to the northern grasslands. About 600 B.C., they were absorbed by their kinsmen, the Scythians, who, in turn, gave way to the Sarmatians. All these peoples maintained an active culture from 250 B.C. to the third century A.D. The groups, however, can scarcely be distinguished one from the other; they all were hard-riding, horse-breeding, and horse-milking people. But it should be noted that the Scythians and Sarmatians did settle down and develop agriculture, raising great quantities of grain, which they exported to Athens and other Greek cities.

Italians. At the western end of the European grasslands, in the Danube Valley and southern Germany, dwelt peoples of similar culture and of Indo-European stock. Very little is known of their early history until they invaded the Italian Peninsula about the second millennium B.C. These were the Umbrians, Samnites, Italians, and Latins, who were to be welded later into one great people known as Romans.

Celts, Germans, and Slavs. The other Indo-European peoples living in western and northern Europe were unimportant until one group, the Celts, moved into what now are Spain, France, and the British Isles, where they developed the progressive La Tène culture noted in Chap. III. It was not until the first century B.C. that the Germanic peoples of Scandinavia and central Europe between the Rhine and Oder rivers began to make themselves felt when their tribes began to invade the Rhone Valley. The Slavs, who lived in the Pripet Valley and possessed a culture less advanced than that of the Germans, will be discussed in a later connection.

The Early Greeks. Of all the early Indo-European peoples, the Greeks were to display the greatest originality and resourcefulness. Although their beginnings are veiled in obscurity, we know that they

constituted one of the groups speaking an Indo-European language who crowded from the grazing lands of the north into the culturally more advanced regions of the Mediterranean. Originally they lived, it appears, on the steppes of what is now southern Russia or on the fertile lands along the Danube, pasturing their cattle and practicing an early type of agriculture. They had horses, used tools made of stone, and lived in small tribes. They believed in Zeus, a sky god whose name meant "day," in Apollo, god of light, and in other nature gods. Their religion was somewhat like that of the Indians as revealed in the *Rig-Veda*—described in the next chapter—which dates from about the time of the first Greek invasions of the mainland and the islands of modern Greece.

The Greeks were still in the later stages of neolithic culture when they crowded southward. First came the brave, hardy Achaeans, who overran the southern regions along the irregular coast of Asia Minor about 2000 B.C. The newcomers mingled with the culturally more advanced peoples already living there, intermarried with them, and received new elements of civilization. Next, about 1400 B.C., came the more backward Dorians and Ionians, whose wanderings are very confusing. The Greeks, like other groups speaking an Indo-European language, became assimilated, in race and culture, with the southerners. As neighbors to the east there appeared the Phrygians, who crossed into Asia at the Dardanelles and Bosporus and founded a powerful state known to history as Phrygia.

MEDES AND PERSIANS. The Medes and Persians were the first of the Indo-European peoples to develop a state of world importance. They belonged to the Aryan branch of the Indo-European folk who moved from the central parts of Asia into the tableland of Persia known as Iran, a form of the word Aryan. They were first noticed during the ninth century B.C., but it appears certain they had migrated into these lands during the previous millennium.

Like their Indo-European kin, the Medes and Persians were active agriculturists and breeders of horses, worked hard, lived frugally, and became a conservative people. Vigorous in body, they were excellent soldiers and capable horsemen. Their army was efficient, its hardy peasant archers shot with unerring accuracy, and its horsemen rode down the foe after it had been thrown into disorder by a shower of deadly arrows.

The Medes and Persians seem to have mingled with the original native population and to have founded two states with capitals, respectively, at Ecbatana and Pasargadae. Not much is known about the early history of either of these peoples save that a powerful native dynasty ruled the Medes until 549 B.C.

Cyrus, the Persian ruler subsequently known as "the Great," seized the crown of the Medes and thenceforth ruled them. In reality, there was no conquest, for the Medes were never subject to the Persians. "King of the Medes and Persians," Cyrus was one of the most impressive figures of history. Capable, energetic, and resourceful, he was above all a humane statesman, presenting in this respect a striking contrast to the ruthlessness of contemporary Assyrian and Babylonian rulers. Cyrus established his authority over many states and peoples. In 546 B.C. he seized the kingdom of Lydia ruled by the fabulously wealthy Croesus, vanquished the unpopular ruler of Chaldea, and by 538 B.C. had extended his sway over all Asiatic territories west of Persia and south of Lydia.

Cyrus died in 529 B.C.; and his successor Cambyses seized Egypt in 525 B.C., annexing it to Persia. Thenceforth, the Persian kings ruled over the entire region between Ethiopia and Nubia in Africa to the borders of India. Cambyses, who died in 522 B.C., was succeeded by Darius the Great (521–485 B.C.), whose genius perfected the political organization of the Persian Empire. The dynasty established by Cyrus ruled until 331 B.C., when Alexander the Great included Persia in his march of conquest.

The Persian State. The Persian Empire was the greatest state, in area at least, that man had hitherto seen. Subject to it were Semites, Hittites, Greeks, and Egyptians, all ruled by a Persian aristocracy. The "great king," or shah, of Persia was also Pharaoh of Egypt and king of Babylon. He was assisted by governors called satraps, who represented him in the satrapies, or provinces, into which his realm was divided. The satraps were efficient provincial agents, holding the vast empire together as a common unit yet allowing the individual provinces, whether Greek, Assyrian, Babylonian, Hebrew, or Phoenician, the greatest freedom in language, religion, and economic life.

This combination of a central government with local freedom and diversity was a remarkable achievement that other empires might have copied with profit. Communication was developed because horses were plentiful, and a well-planned system of highways connected the satrapies with the imperial capital at Susa. Dispatches were carried between king and satraps by relays of mounted messengers, who traveled with the greatest speed. So effective was this system that it became known popularly as the "king's eyes and ears."

Economic Life. Bringing together so large a number of peoples under the sway of one ruler greatly stimulated economic prosperity. A condition of peace throughout the far-flung empire also proved a boon to business. Commerce grew rapidly, not only between Egypt and the Tigris-Euphrates Valley by way of the Fertile Crescent but also with

MAP VIII.—The Persian Empire.

the economically more backward peoples living outside the empire. Thus, for the Egyptians, Babylonians, Lydians, and other subjects of the Persian Empire, their former economic life not only continued, as described in foregoing chapters, but was intensified. Tribute, collected from subject peoples according to the wealth of the satrapies, poured vast sums of money into the coffers of the Persian rulers.

Use of coined money as a means of facilitating this extensive trading was introduced in all parts of the Persian Empire. This was a long step forward from the days of primitive barter or the more advanced Sumerian custom of using metal bars on which was stamped the guarantee of weight and quality. Ancient methods of making payment were cumbrous, and it is not surprising that someone hit upon the idea of issuing a metallic coinage. This was first done during the seventh century B.C. in Lydia, a country rich in gold and silver, where the kings stamped small pieces of gold, silver, and electrum (a mixture of the two former metals), guaranteeing the pieces as to weight and fineness.

The Lydians used the Babylonian system of weights, and the Persians followed their example. The chief Persian coin was the *daric*, which weighed 8.4 grams and was equivalent to about $3.60 in American money. The Persian system of coinage was adopted by the Greeks, the Romans, and the people of the Middle Ages. We still use stamped money in small businesses; in large transactions the need for direct payment in heavy coin is eliminated by the use of paper money, an improvement of the Middle Ages, when the bill of exchange was invented.

Persian Writing. The Persians found it easier to adopt the cuneiform script employed by the neighboring Babylonians than to invent their own form of writing. They greatly improved the system by reducing the number of signs to forty-three, each of which possessed a definite phonetic value. Persian inscriptions were drawn up in cuneiform, but the signs differed in value from those used by the Babylonians. The cuneiform script slowly died out after the conquest of the empire by Alexander the Great. Ability to read the inscriptions became a lost art until scholars of the past century succeeded in differentiating between the Persian and the Babylonian signs. For a diplomatic language, particularly in the Near East, the Persians adopted the Aramaic tongue and continued using the Aramaic alphabet, parent of the Persian *Pahlavi* script, after cuneiform writing fell into disuse.

Zoroastrianism. Zoroastrianism, one of the world's most ancient religions, originated among the Persians, who for centuries had worshiped a major god of the sky—the protecting Father of Light. But a prophet appeared, named Zoroaster, whose life and activities are almost legendary, earlier scholars even questioning that such a person actually lived.

Modern scholars, however, have decided that he was a historical character and that he lived perhaps during the seventh century B.C.

Zoroaster started a revolution in religious ideas, for he taught that the powers ruling the world were divided into two equal forces, good and evil, each contending bitterly for supremacy. The good spirit Ormazd fought the evil spirit Ahriman, each being supported by a group of loyal spirits. When man enlisted in the cause of Ormazd, the personification of light and purity, he had to tell the truth, be forthright and moral, practice charity, be hospitable to strangers, and respect the dead. Ormazd had created all that was good; hence, the Persians were ordered to cherish the useful ox, the watchful dog, and the cock. Ohrmazd declared:

> I have made the dog self-clothed and self-shod, watchful, wakeful, and sharp-toothed, born to take his food from man and to watch over man's food. And whatsoever shall awake at his voice neither shall the thief nor the wolf steal anything from his house without being warned; the wolf shall be smitten and torn to pieces. For no house can subsist on the earth made by Ahura, but for those two dogs of mine, the shepherd's dog and the house dog.

Ahriman, on the other hand, had brought forth destructive insects, flies, serpents, and beasts of prey.

Zoroastrianism was the religion of a conservative agricultural and cattle-raising people and so particularly suited to the Persians. One can find little fault with Zoroastrian moral conceptions, the emphasis on "good thoughts, good words, and good deeds." Man is judged in the hereafter, the righteous joining the company of the servitors of Ahura-Mazda, the wicked falling into the abyss to become slaves of Ahriman.

Although the Zoroastrian religion never died out, knowledge of it disappeared almost entirely among European scholars. Finally a Frenchman Abraham Anquetil-Duperron (1731–1805) determined to find out whether there were any Zoroastrians still in existence. He enrolled as a common soldier in the French army sent to India. There he became acquainted with Zoroastrian priests, was shown their sacred texts, after years of toil learned the language in which they are written, and translated them into his mother tongue.

The Zoroastrian sacred scriptures are called the Zend-Avesta. They are composed of several parts, the chief of which are the *Gathas* and the *Vendidad*. The doctrines of Zoroaster were laid down in the *Gathas*, a group of hymns, one of which expresses these lofty sentiments:

> By his holy Spirit and by Best Thought, deed, and word, in accordance with Right, Ahura Mazda with Dominion and Piety shall give us Welfare and Immortality.

The best work of this most holy Spirit he fulfills with the tongue through the words of Good Thought, with work of his hands through the action of Piety, by virtue of this knowledge; he, even Mazda, is the Father of Right.

Thou art the holy Father of this Spirit, which has created for us the luck-bringing cattle, and for its pasture to give it peace has created Piety, when he had taken counsel, O Mazda, with Good Thought.

From this Spirit have the Liars fallen away, O Mazda, but not so the Righteous. Whether one is lord of little or of much, he is to show love to the righteous, but be ill unto the Liar.

And all the best things which by this holy Spirit thou hast promised to the righteous, O Ahura Mazda, shall the Liar partake of them without thy will, who by his actions is on the side of Ill Thought?

Through this holy Spirit, Ahura Mazda, and through the Fire thou wilt give the division of good to the two parties, with support of Piety and Right. This verily will convert many who are ready to hear.

The *Vendidad* was composed later and contains sacred stories as well as accounts of priestly rites and purificatory exercises. The first chapter deals with creation and the blighting effects of evil:

Ahura Mazda spoke unto Zoroaster, saying: I have made every land dear to its people, even though it had no charms whatever in it. Had I not made every land dear to its people, even though it had no charms whatever in it, then the whole living world would have invaded the Airyana Vaego [Iran].

The first of the good lands and countries which I, Ahura Mazda, created was the Airyana Vaego, by the Vanguhi Daitya [the Axares]. Thereupon came Angra Mainyu [Ahriman], who is all death, and he countercreated the serpent in the river and Winter, a work of evil spirits.

There are ten winter months there, two summer months; and these are cold for the waters, cold for the earth, cold for the trees. Winter falls there, the worst of all plagues. . . .

The fourth of the good lands and countries which I, Ahura Mazda, created, was the beautiful Bactria [Balkh] with high-lifted banners.

Thereupon came Angra Mainyu, who is all death, and he countercreated the ants and anthills. . . .

The eleventh of the good lands and countries which I, Ahura Mazda, created was the bright, glorious Saistan.

Thereupon came Angra Mainyu, who is all death, and he countercreated the evil work of witchcraft.[1]

Zoroastrianism is to be regarded as one of the important religions of the world. It molded Persian life and character, advocating sincerity, sobriety, truthfulness, and steadfastness of purpose. Although practically suppressed in medieval times, it survived in India and today is the religion of various small groups. Zoroastrianism influenced

[1] *The Sacred Books and Early Literature of the East*, Vol. VII, Ancient Persia, pp. 43–44, 58–59, Parke, Austin, and Lipscomb, Inc., New York.

Christianity as well, first through a special form known as Mithraism, popular during the second century A.D., next through Manichaeism, which arose to challenge the orthodox in the third century, and later through the Albigensian heresy of the eleventh and thirteenth centuries.

Persian Art. Persian art was essentially an imperial art, for it embraced Lydian, Egyptian, and Babylonian as well as native Persian ideas. The kings of Persia built vast palaces and governmental buildings at Ecbatana, Pasargadae, Persepolis, and Susa, whose scanty ruins give archaeologists some idea of their original appearance and former grandeur. The ruins of Persepolis, the capital established by Darius the Great, are scattered over an elevated terrace with a double ramp leading to the top. This structure was flanked by a long series of splendid sculptures representing Persian officials coming with gifts to the king. The great hall of Xerxes was a columned structure of mammoth proportions, 375 feet long and 300 feet wide. The few columns still standing are over 63 feet high and peculiarly Persian in form. In detail, the bases are bell-shaped and the shafts fluted, and elaborate capitals formed of the fore parts of bulls decorate the tops. The bull motif to decorate capitals of columns may have been borrowed from Assyria, as was certainly the winged-bull motif for doorways and heads of staircases. The abundance of glazed brick bearing reliefs depicting scenes from Persian governmental life clearly points to Babylonian influence. Some of the buildings in the terrace at Persepolis obviously show Egyptian influences, especially in the cornices over the doorways.

Tombs. Cyrus the Great's tomb at Pasargadae is a funerary chapel erected on the customary base, with steps leading up to the top; it follows in design the sepulchral structures commonly erected in Lydia. But the Persian kings who came after Cyrus the Great did not adopt this style for their final resting place, nor did they follow that of the great rulers of Egypt and the Tigris-Euphrates Valley. They cut vast tomb chambers out of rocky hillsides, a form of tomb essentially original and Persian. In other constructions, Persian artists were the first to combine the best ideas of their subject peoples with native motifs into a style that expressed the national and imperial character most eloquently.

The history of the Persians, long neglected by students of culture, is exceedingly important. They were the first people speaking an Indo-European language to develop a world empire, the largest that had yet come into existence. Using their Egyptian and Babylonian cultural contacts, the Persians produced a remarkable civilization, skillfully bringing together the best elements of their diverse empire to serve their needs. Much of the driving force behind Persian culture was drawn from Zoroastrianism. Its thoroughgoing dualism exerted much influence, profoundly affecting Persian morals and conduct. The Persians made

such noteworthy contributions to the art of governing large states that their methods were appropriated by the later Hellenistic monarchs, who in turn influenced imperial Roman practices.

But leadership in world politics passed from the Persians to the Greeks and Romans, whose brilliant civilizations must now be considered. Before turning our attention to them, however, we shall digress for a moment to describe the civilization of India, which had attained great distinction by the time the Persian Empire succumbed to Greek might. Indian civilization was in part, at least, created by the Aryans, an Indo-European people closely related to the Persians. Because this civilization usually is regarded as oriental, we shall also pay some attention now to the emerging culture of the Hwang Ho Valley in China.

FOR FURTHER READING

CHILDE, V. G.: *The Aryans*
COOPER, M. C.: *Grass*
DAWSON, M. M.: *The Ethical Religion of Zoroaster*
DELAPORTE, LEON: *Les Hittites*
HUART, C. I.: *Ancient Persian and Iranian Civilization*
JACKSON, A. V. W.: *Researches in Manichaeism*
———: *Zoroastrian Studies*
———: *Zoroaster the Prophet*
MYRES, J. L.: *Who Were the Greeks?*
PAVRY, J. D. C.: *The Zoroastrian Doctrine of a Future Life*
RAGOZIN, Z. A.: *Media, Babylon, and Persia*, 4th ed.
ROSTOVTZEFF, M. I.: *The Iranians and Greeks in South Russia*
SYKES, PERCY: *A History of Persia*, Vol. I

Chapter VIII

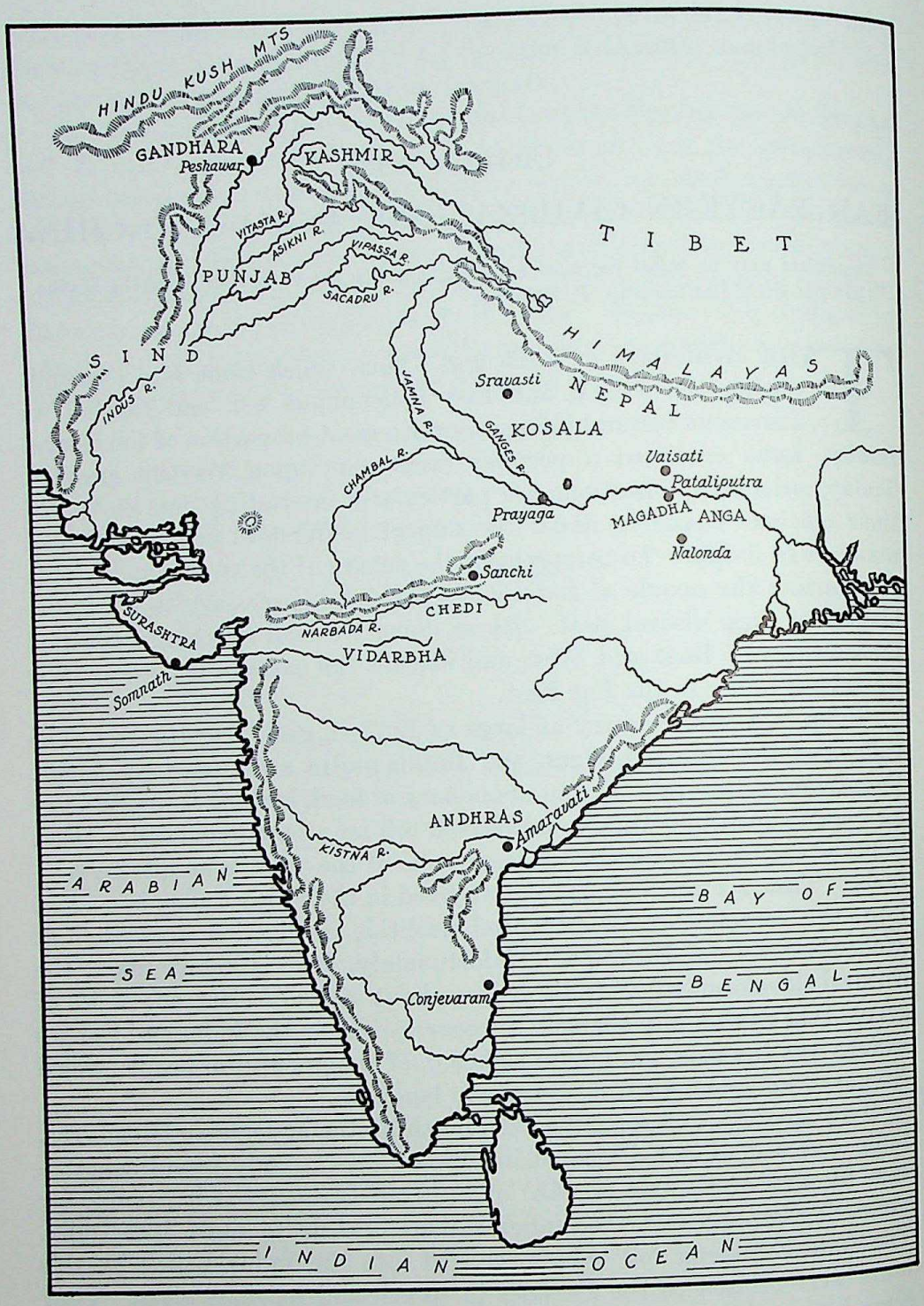
FAR EASTERN CIVILIZATIONS: INDIA AND CHINA

Hinduism may be called the most searching quest in the natural order of the Divine that the world has known.—P. Johanns

THE civilization of India and China, which came into existence during the second and first millenniums B.C. and exerted an enormous cultural influence over a great proportion of the human family, have exercised a peculiar fascination upon Western peoples. Today, oriental civilizations are particularly interesting, for we behold their cultures changing under the impact of Western conceptions and manners of living. To comprehend the nature of the stupendous events confronting the people of India and China, it is necessary to study the history of their distant past. By so doing we shall be able to contrast the cultures of East and West and explain the extraordinary spectacle we behold today in the Far East.

India is a vast country as large as Europe, excluding Russia. The valleys of the Indus, Ganges, and Brahmaputra are immensely fertile. Bounteous nature provides an abundance of food, making it unnecessary for man to spend his time in unrelieved toil for a bare livelihood. Here, if anywhere, it was possible to create one of the world's unique civilizations. That a numerous population lived in the Indus Valley is evident from the remains of an advanced neolithic civilization excavated at Mohenjo-daro and Harappa. Unfortunately, little is known about the cultural development of India before about 500 B.C. But one series of events that profoundly changed the course of life in the Indus and Ganges valleys was the invasion before 1500 B.C. of an agricultural people, called Aryans, who spoke an Indo-European language.

The Aryans. Bounded on the north by the impassable Himalayas, India was well shielded against invading hordes. Only from the northwest by way of Bactria (Balkh) or the Iran Plateau was it possible for wandering groups from the inner regions of Asia to move into India. The Indo-European folk who advanced into the Indus Valley by this route were related to the Persians in speech and religious ideas. They came into hostile contact with a dark-skinned people usually described as of Dravidian stock. After much fighting the invaders seized the northern parts of the peninsula, extended their power to the Vindhya Hills, and penetrated as far south as the tableland of the Deccan. The



Map IX.—Ancient and medieval India.

people of Dravida, living in the southern tip of the peninsula, completely escaped Aryan domination and did not mingle with the conquerors of the north until many centuries later. The origins of these Dravidian, or Tamil, people, who still occupy this region and possess their own language and literature, are shrouded in the darkness of the Neolithic Age.

Religion in Early India: the Rig-Veda. Inured to the hard life of the Persion plateau and desert, the Aryans were vigorous, resourceful, and skillful. Their gods were personified forces of nature; Indra was the lord of thunder, lightning, and rain, and Agni of fire. Dawn, sun, and wind and a host of other gods were propitiated. It was a simple religion, much like that of the Persians before the advent of their great teacher Zoroaster. These religious beliefs are revealed to us in a remarkable monument of literature, which is especially interesting because it is the first literary work of a people who speak a language related to our own. The hymns of the Rig-Veda were written in Sanskrit, the language of the Aryan invaders, but the time of their composition is uncertain, the latest date generally given being about 1500 B.C.

The Rig-Veda comprises 1,017 hymns praising creation and the gods. The following to Indra is a fair example:

> Drive all our enemies away, O Indra, the western,
> mighty conqueror, and the eastern
> Hero, drive off our northern foes and southern, that
> we in thy wide shelter may be joyful.
> What then? As men whose fields are full of barley
> reap the ripe corn removing it in order,
> So bring the food of those men, bring it hither, who
> went not to prepare the grass for worship . . . .
> Indra is strong to save, rich in assistance: may he,
> possessing all, be kind and gracious.
> May he disperse our foes and give us safety, and
> may we be the lords of hero vigor.
> May we enjoy his favor, his the holy: may we enjoy
> his blessed loving-kindness.
> May this rich Indra, as our good protector, drive off
> and keep afar all those who hate us.

Brahmanism. Little is known about Indian history for a thousand years following the Aryan conquest. During this period, however, there came into existence an elaborate religious system known as Brahmanism, the basis of present-day Hinduism. The Brahman religion was founded upon the teachings of the gods set forth in the Rig-Veda. Writing did not come into existence until many years after their composition, and therefore these hymns were transmitted orally from generation to generation. The people were scarcely able to memorize them; hence, the task

of perpetuating them and teaching the truths of Vedic religion fell into the hands of a special class of prayer men, or priests, called Brahmans. The system of sacrifices was greatly elaborated. Eventually it was believed that sacrifices were mysterious operations which, if carefully executed, would force the gods to grant the favors asked. The more elaborate and expensive the sacrifices, the more efficacious. The power of the Brahmans grew rapidly until they came to be regarded almost as gods and fees paid to them were considered as effective as the sacrifices themselves. No layman possessed the knowledge to perform the sacrifices according to the elaborate rules, and thus the Brahmans became a powerful, wealthy group.

A remarkable institution, the caste system, grew up during this period. Its beginnings may be descried faintly in the hymns of the Rig-Veda, but the castes became established only when the Brahmans began to teach that they were divinely ordained. The institution of caste possesses no close parallels in any other civilization. It grew from several roots. First was the Brahman priestly exclusiveness; as a holy man, the Brahman taught that he could not associate with nonholy laymen. Color also was a factor; the blond Aryan invaders of the north objected to mingling with native dark-skinned peoples. Four superior, pure castes were formed: Brahmans (priests), warriors, cultivators, and serfs, called *Sudras*, descendants of natives conquered by the Aryan invaders. Other castes embracing the lowest classes came into existence later, and thus the entire population of India became a network of groups mutually exclusive. Caste is a complex institution; its practical workings are so involved that it cannot be described in a few lines, and to give an adequate explanation of its origins is well-nigh impossible. It has been, however, a factor of great importance in the life of India for more than three thousand years.

Brahmanism spread over India and profoundly influenced the Dravidian peoples of the south. But its teachings possessed serious defects. It was extremely polytheistic, a large number of gods ultimately being recognized; it was rigid and priest-ridden in character; and there was much insistence upon formal sacrifices. Many, even among the Brahmans, were dissatisfied with this formalism and yearned to worship a deity whose power supported the universe and all life in it.

These religious and philosophic strivings were expressed in a set of writings known as the Upanishads, which represent men's efforts to discover the meaning of the universe. In former times, especially as shown by the hymns of the Rig-Veda, the gods were regarded as human, but this anthropomorphism completely vanishes in the Upanishads. Atman, the Universal Spirit, is said to be the supreme principle of the universe; it is "the web on which the world is woven," the very substance

of our souls. This feeling is well expressed in the *Brihad-aranyaka Upanishad.* "He who, dwelling in the earth, is other than the earth, whom the earth knows not, whose body the earth is, who inwardly rules the earth, is thyself, the Inward Ruler, the Deathless."

In the *Munkada Upanishad* the Universal Spirit is conceived as being pure spirit. "That heavenly Person is without body; he is both without and within, without breath and without mind, pure, higher than the high Imperishable."

Atman is the Universal Spirit from whom come all things and toward whom all tend. "As the flowing rivers disappear in the sea, losing their name and their form, thus a wise man, freed from name and form, goes to the divine Person, who is greater than the great."

This was indeed a far-reaching revolution in religion and philosophy. The object of worship was no longer to gain material rewards but to know the Universal Spirit for its own sake and for the moral and intellectual good possible from such knowledge. But how explain good and evil, the varying fortunes of mankind, and marked differences in character? This was achieved by the doctrine of the transmigration of souls. A soul comes from the great original Universal Spirit and passes through a series of incarnations. It may in one life appear as a man, in another as a god or as an animal, a plant, or even an inanimate object.

Closely related to this idea of transmigration is that of *karma*, or "action." A man's body, character, abilities, temperament, wealth, position, in fact, his very characteristic and experience are determined by the good or evil he has done in previous existences. Moreover, one's misfortunes during this life are punishments for wrongs done in previous existences, just as one's good fortune is the result of previous good deeds. This idea is succinctly expressed in the *Brihad-aryanaka Upanishad.* "As a man's desire, so is his will, and as is his will so is his deed, and whatever deed he does that will he reap."

"Release" consists in being freed from the necessity of an endless series of incarnations; it can be achieved only by reunion with the Universal Spirit, the source and end of all, as this Upanishad states. "When all the desires that once entered his heart are undone, then does the mortal become immortal, then he obtains Brahman. And as the slough of a snake lies on an anthill dead and cast away, thus lies his body; but that dismembered immortal spirit is Brahman only, is only light."

GAUTAMA BUDDHA. Just as the Brahman authors of the Upanishads disliked the traditional doctrines of Brahmanism, so also did the leader Gautama, who died about 480 B.C. He belonged to a family of princes who governed a small Indian state on the slopes of the Himalayas. Living the wealthy, leisurely life of an aristocrat, he hunted, played, and adored his beautiful wife. But he was far from satisfied; the thing

that oppressed him was the fundamental problem of existence—the meaning and purpose of life. He was suspicious of the priestly exclusiveness of the Brahmans, hated their formal sacrifices, and recoiled from the pain and misery about him.

An anecdote relates that one day he saw an old man bent painfully under the burden of years. "Such is the way of life, and to that condition we all must come," said his charioteer companion when Gautama commented on the scene. Next he saw a man suffering from a repulsive disease. "Such is the way of life," said the charioteer. Then Gautama observed an unburied corpse torn by birds and beasts. "Such is the way of life," said his companion. At length they met a begging ascetic of whom there were as many then as today in India. This man seemed truly holy and discussed learnedly the deep meaning and purpose of life until Gautama was fired with a fervent desire to become an ascetic. Abandoning his wife and newborn son, he fled his realm and broke every tie with subjects, friends, and family. In the Vindhya Hills, he gave himself over to fasting and penances, denying himself sleep and subjecting his body to rigorous self-torment. After he had swooned from want of food, he realized that such physical austerities helped little in solving the riddle of life's meaning and, to the dismay of his companions, abandoned asceticism. Through reflection, Gautama gradually began to discover the way of truth. Finally, a revealing vision appeared to him as he was sitting under a large tree. All day and night he sat meditating profoundly upon the revelation of truth he had received. Then he rose resolved to impart his knowledge to mankind.[1]

Gautama Buddha, or "The Enlightened," as he was now called, recommended mild asceticism but condemned self-torture. Salvation was to be achieved by right knowledge and right living as set forth in the ten commandments of Buddhism, which forbade killing, stealing, impure thought or action, being false in language, being double-tongued, using evil language, using glozing speech, covetousness, anger, and adopting heretical views. This method of finding truth could be followed without the aid of the Brahmans and regardless of caste. Its three basic propositions are that all life is transitory, that it is pure misery, and that every being lacks an individual soul. If a man fully comprehends these three points, he will feel no need of personal salvation. He will break all ties with life to obtain complete extinction, a condition

[1] The facts of Gautama's life are related in the *Book of the Great Decease*, a treatise composed about two hundred years after the Buddha's death, perpetuated by oral tradition, and finally committed to writing about 70 B.C. The story of Gautama's life and enlightenment therefore rests upon tradition and not upon statements by witnesses. The translated *Book of the Great Decease* is printed in *The Sacred Books and Early Literature of the East*, Vol. X, pp. 53–143.

called *nirvana*. Freed from lust, hatred, ambition, and ignorance, he will upon death be completely free because his separate existence will cease. "One thing only do I teach, O monks," said the Buddha, "sorrow, and the ending of sorrow."

MAHAVIRA: JAINISM. Jainism, another religion characterized by ascetic piety, was founded by an older contemporary of Gautama, Mahavira, who died about 527 B.C. Not much is known about him. Like Gautama, he deserted wife and family, renounced a princedom, and turned his back upon the world. After deep reflection he achieved "enlightenment," which he preached as a simple but severe doctrine. He, too, objected to the authority of the Brahmans, abhorred formal and bloody sacrifices, and taught an extreme reverence for life. He believed that not only animals and plants but also earth, fire, water, sun, and wind were living things; thus the Jains, as Mahavira's followers are called, took painstaking efforts not to hurt any living thing. Severe asceticism lasting 12 years was required to win salvation, the extremists going about in a nude condition and even advocating suicide through starvation. Buddhism and Jainism were alike in one fundamental respect: salvation consisted in uprightness of life, not in superior metaphysical knowledge of a privileged group or in bloody sacrifices.

INDIAN LITERATURE. The literature of India is remarkable in its range. After the religious hymns of the Rig-Veda and the philosophical discourses of the Upanishads there appeared two epics, the *Ramayana* and *Mahabharata*, both of them dating from about the time of Gautama. The *Ramayana* is an account of Prince Ramachandra, who, exiled because of a palace intrigue, was accompanied on his wanderings by his faithful wife Sita. She was carried off by a giant; but after heroic adventures her husband rescued her, and they returned to the realm from which they had fled to live happily during the rest of their lives. The *Mahabharata*, composed as late as 200 B.C., deals with a legendary war among the princes of northern India. This long poem contains many episodes treated in splendid style.

Another literary form, which came into existence by the time of Gautama, were fairy tales and fables told with a moral. An interesting feature of this type of literature is the grouping of tales within the framework of a larger story. This style of narration was imitated in other lands, the *Arabian Nights* being perhaps the most notable example. The *Panchatantra* was prepared as a manual of instruction for princes. The quaintly humorous stories for the most part deal with the doings of animals and teach obvious lessons of right and wrong. Thus a cat who pretended to be pious was called to serve as an umpire between a sparrow and a monkey. The cat began to discourse upon the vanity of life and on the necessity of practicing virtue. Completely disarmed by his hypo-

critical talk, the sparrow and the monkey drew near. The cat seized the sparrow and the monkey and devoured them both. The *Hitopadeca*, or *Book of Good Councils*, compiled at a later date, owes its best animal stories to the influence of the *Panchatantra*.

Curiously, animal tales have played an important part in the history of the world's literature. Those of the *Panchatantra*, for example, were translated into Persian during the sixth century B.C. From Persia this literary type found its way through Babylonia westward to Greece, where it was employed by Aesop, the Greek writer of fables of the sixth century B.C. During the Middle Ages, animal tales were utilized in the moralizing and allegorical bestiaries. Finally, during the twelfth century, appeared *Reynard the Fox*, one of the masterpieces of European literature, an interesting example of cultural diffusion.

Persian Influences in India. After the time of Mahavira and Gautama, northern India remained divided into small states, of which Magadha and Kosala were the most important. The people continued to live according to their age-old habits. However, those who lived on the broad plain of the Punjab in northwestern India never lost contact with their kin on the Iran Plateau because of the similarity of their language, religious ideas, and institutions. During the sixth century, King Cyrus the Great subjected Persia to his rule and extended his empire to the Punjab. Persian influences filtered into India and Indian ideas made their way into Persia in spite of the fact that Zoroaster's religious teaching had nearly eradicated the influence of the old Aryan pantheon as described in the Rig-Veda. This close connection between Persia and northern India explains why beast stories were readily taken over by the Persians. On the other hand, the Aramaic alphabet as adapted by the Persians in their Pahlavi script was introduced into India, where it became the basis of the widely used Kharoshthi alphabet.

The Maurya Dynasty: Asoka. Following the Persian influence in India appeared that of the Greeks under Alexander the Great, who conquered Persia and occupied parts of the Punjab from 327 to 325 B.C. Although Alexander's premature death in 323 B.C. led to the breakup of his vast empire, which stretched from Nubia to India, Greek ideas and Greek ways were planted in Persia and exerted some influence upon Indian life and art. Chandragupta, who rose in rebellion on the news of Alexander's death and from his capital in Magadha succeeded in subjugating the princes and clans of northern India, is the first emperor of India and founder of the remarkable Maurya Dynasty, which governed the major part of India from 322 to 185 B.C.

Asoka, his grandson, who came to the throne in 273 B.C., extended the imperial rule over all the peninsula save its southern tip and over a large part of the territory west of the Indus River. Inheriting a large army

from Chandragupta, Asoka chose the road to conquest and attacked the people of Orissa. It was a bloody war; the natives resisted with determination, and vast numbers were slain. The spectacle so shocked Asoka that he recoiled from the wanton cruelty and, turning to the gentle Buddha for guidance, determined to shape his rule according to the precepts of the great teacher. His officials were given instruction in Gautama's doctrines, particularly the one that insists upon kindness to all living things; and edicts carved in stone were set up that the people might be informed what their ruler expected of them. He abolished animal sacrifices, royal hunting, killing of animals for food, and harsh punishment. He ordered jails to be opened, freed prisoners on the anniversary of the emperor's coronation, and granted pardons liberally. Asoka tried to rule India through gentleness, liberality, compassion, and forgiveness—characteristic Buddhist virtues. Unfortunately, other princes of the Maurya Dynasty failed to govern by such exalted principles and ignored the opportunity of molding the life of a country by religious influences.

Art under the Maurya Dynasty. Under the Maurya Dynasty the art of India attained classical excellence. Its basic inspiration was the religious philosophy of Gautama, but Brahman elements were also present. The Brahmans constructed temples of varying designs hewn out of solid rock and elaborately decorated with sculptures of the gods of the Rig-Veda. But under Buddhist and Jain influences an entirely new art arose in connection with the worship of the followers of Mahavira and the Buddha.

Stupas, the earliest Jain and Buddhist structures, were conical mounds erected over the ashes or relics of the Buddha or of a Jain or Buddhist saint. The surface was covered with blocks of stone, the whole being surmounted by a stone umbrellalike structure, the symbol of nobility. Around the stupa was a raised platform provided for the use of pilgrims. The stupas were surrounded by a railing, first of wood and later of stone, to keep out intruders. Admission to the platform was through four openings, each one provided with a strikingly ornamental gate decorated with carved stone figures illustrating scenes from the life of Buddha or of a Jain or Buddhist saint. Asoka built a large number of such stupas, the one at Sanchi known as the Great Stupa, 56 feet high and 121 feet in diameter, being especially famous and well-preserved.

By the side of each stupa was erected a vihara, or home, of a hermit who had dedicated his life to the pious duty of caring for the shrine. The vihara was a small rectangular structure provided with a gabled roof that recalls the sanctuary of the tomb of Cyrus the Great at Pasargadae in Persia. It is obvious, therefore, that Greek influences were at work on the viharas.

The followers of Mahavira and the Buddha also constructed cave temples called *chaityas*, hewn out of the living rock. As a rule, these cave temples were made according to a fixed plan, a rectangle terminating in a semicircular apse at the end opposite the entrance. Two rows of columns support the vaulted ceiling. The apse houses a mound containing relics; and a colossal carved figure of the seated Buddha gazes, in characteristic and pensive mood, from a niche. Such Buddhist cave temples contain little decoration, whereas the Brahmans provided their cave temples with elaborate ornamentation. The Brahman temple on the island of Elephanta near Bombay contains several rows of elaborately decorated columns. The one near Ellora, hewn out of a mass of granite a mile in circumference, is even more imposing.

FIG. 20.—"Gandhara Buddha," second century B.C. (*Courtesy of the Seattle Museum of Art.*)

Characteristic of Buddhist worship are the numerous carved figures representing the Buddha seated with legs crossed and hands in lap and with a languid, benign expression. The posture and expression are essentially Eastern and true to Buddhist ascetic ideals, but the details frequently show Greek influence. In the technical details of workmanship and the arrangement of the draped robes the figures are similar to Greek statues. Such Western ideas are clearly shown in the fine representation of the Buddha in Gandhara near Peshawar in northwestern India, where Greek influences were especially potent.

China.—We now turn farther east, to China, to consider the unique civilization that arose in this country after the close of the Shang Dynasty (about 1150 B.C.). Three rivers, the Hwang Ho, the Yangtze, and the Si, drain the vast plain of China and discharge their waters into the Yellow and China seas. Their valleys constitute the greater part of China and give to the country a striking geographical unity in spite of some mountainous areas. To the south are the jungles of Burma; to the west the plateau of Tibet and the Kunlun Mountains. North of these lie the arid region of Chinese Turkestan and the Tien Shan Mountains. These natural barriers served to isolate China from Siam, Burma, India, and Central Asia. But, from Mongolia on the north, the fertile expanses of the Hwang Ho Valley lay open to greedy nomadic groups such as the mongoloid Huns and Mongols, whose successful invasions proved most significant in the history of Chinese civilization.

Chinese culture has always centered in agriculture, particularly rice growing. Agricultural beginnings, lost in antiquity, clearly had become a characteristic feature of China by the time of the Shang Dynasty. Another contribution by the Chinese was sericulture, the production of silk from the threads of the cocoons of the silkworm. According to tradition, its secrets were discovered several thousand years before Christ; it is well established that silk culture was already an important industry shortly after the beginnings of iron culture, which occurred about 500 B.C. Three hundred years later, it was introduced into Korea. For centuries the Chinese jealously guarded the secrets of the manufacture of silk, keeping it a commercial monopoly.

Early History of China. The study of early Chinese history is attended with almost insuperable difficulties. The numerous literary accounts of ancient Chinese writers cannot be trusted, and their statements that Chinese culture dates from hundreds of thousands of years B.C. should be received with skepticism. The oldest historical classic is the *Shu Ching*, or *Book of History*, by Confucius. This purports to date from 2205 B.C. but is actually of late composition, which is revealed by contradictory phrases as "examining into antiquity we read." The Emperor Yao is said to have been an astronomer who calculated the

length of the year, studied the movements of sun and moon, marked off the seasons, developed a zodiac, and prepared the calendar. "Ah you," he said to his officers, "a round year consists of three hundred, sixty, and six days. Do you, by means of the intercalary month, fix the four seasons and complete the period of the year." But it is doubtful whether Yao ever lived. The same is true of Shun, who is supposed to have "made uniform the standard tubes, with the measures of length and of capacity, and the steelyards." That the *Shu Ching* contains elements of truth is not to be denied, but it is difficult to separate the grains of historical fact from the chaff of literary embellishment.

It is certain, however, that Chinese society, by the year 1000 B.C., possessed an elaborate organization. There was an imperial palace staffed with an extensive personnel, taxes were levied systematically, the empire was divided into provinces, and numbers of officials carried out the imperial decrees. The rank and file of the people were grouped into nine classes, growers of grain, gardeners and producers of fruit, foresters, raisers of livestock and poultry, artisans, merchants, makers of clothing, domestics, and a group following miscellaneous callings. Candidates for public office were examined in horsemanship and archery, writing, reckoning, music, and public ceremonial.

The Chou Dynasty (about 1150 to 249 B.C.), which governed the Hwang Ho Valley and adjacent regions in such an auspicious manner, at length fell upon evil days. Its authority so declined that power fell into the hands of provincial governors, ambitious officials, and wealthy landholders. There were petty wars between the noblemen, who completely disregarded the well-being of the people. This period, known as the "Feudal Age," dates approximately from 722 to 479 B.C. It presents remarkable parallels with the turbulent age following the disintegration of Charlemagne's realm in western Europe during the ninth and tenth centuries A.D. There were violence, treachery, and much killing, which the hereditary rulers were unable to curb. For a while, it seemed as if the Chinese Empire would completely disintegrate.

Early Chinese Religion. That the empire did survive the turbulent times described above is due largely to the fundamental good sense of the common people and the character of their religion as eventually patterned in Taoism and Confucianism. But before these great schools of thought evolved, the Chinese experienced the forms of religion usual among primitive peoples, animism, magic, monotheism, and pantheism. Divination was common; priests determined the answers to petitioners' requests from the way inscribed bones cracked when held over a fire. There were also offerings of fruits, grains, and domestic animals. Under the Shang Dynasty, human sacrifices were common. Archaeologists have

discovered instances of the slaughter of servants and dependents that their spirits might accompany the soul of their master into the realm of death. Fertility cults and gods representing the male and female principle show that anthropomorphic conceptions existed among all classes. Ancestor worship was also a feature; and, more remarkable, the cult of a supreme being was already ancient when the Feudal Age began.

TAOISM. Well established by the close of the Feudal Age, Taoism represents the thought of one Lao-tse, who, according to tradition, was

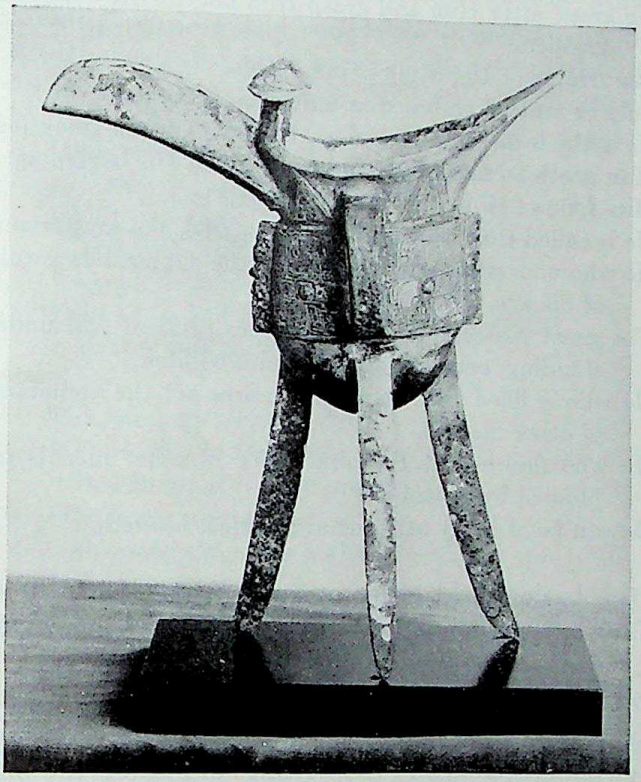


FIG. 21.—Bronze libation tripod. Shang Dynasty. (*Courtesy of the Seattle Museum of Art.*)

born in 604 B.C. He is said to be the author of the *Tao Te Ching*, or *Canon of Reason and Virtue*. Scholars now believe that no such person ever lived and that the *Tao Te Ching* was written long after the sixth century B.C. It is very difficult to grasp its thought because of its abstruseness, paradoxes, and oriental imagery. As in the Brahman philosophy of the Upanishads, special stress is laid upon the incomprehensibly perfect unity that stands behind all material things. The Eternal Spirit is the First Cause; but the author of the *Tao Te Ching* is reluctant to define him in terms of mundane human thought.

The spirit that can be uttered is not the eternal Spirit.
The name that can be named is not the eternal Name.
Nameless—He is the origin of heaven and earth.
Named—He becomes the mother of all beings.
Therefore he alone who is free from things understands the spiritual.
He who still strives after things grasps only the shell.
We look for Him and see Him not, for He is invisible.
We listen for Him and hear Him not, for He is inaudible.
We grope after Him and grasp Him not, for He cannot be grasped.
The trinity of His being is indivisible.
Only in mutual embrace as unity can it be known.
He is the form of the formless, the image of the imageless.
Man goeth to meet Him and cannot find His beginning.
Man follows Him and cannot find His end.
He is called that which cannot be named, the mysterious.
He who understandeth the mind of the old masters is ruler of his age.
The great masters of antiquity were prudent and understanding, endued with profound wisdom.
He who is filled with the spirit desires not the abundance of other men.
He who desires not the abundance of other men is not blinded by novelty—
He can be of lowly attitude and perfect himself.

Tao is the basic world order or spirit from which all creation has sprung. Taoists were convinced that true knowledge could not come from labor, reason, and cooperation with this harsh world. It was to be found in the mystical contemplation of Tao, the unity that transcends temporal realities. True knowledge is attained only through intuition. The words of philosophers and the writings of masters are but "the dregs and leavings of the ancients." Taoist mysticism produced, however, some noble expressions, some of which approach in nobility and purity even the Sermon on the Mount.

He who purifies his inner vision is free from deformity.
He who hath little in desire to him shall be given.
He who hath much shall miscarry.
He who ruleth his passions and compels them to meekness is like unto a child.
The holy man embraces the unity and becomes a pattern to the world.
The unity of the Nameless frees from desire.
Freedom from desire produces the great peace—

So is the world set right from within outwards.
The holy man shuns ambition, shuns arrogance, shuns the desire of greatness.
The holy man puts self in the background—and behold it comes forward.
The holy man surrenders his soul, and behold it is saved.
The holy man lives solitary in the world, but his heart hath room for all.[1]

So far as the practical world is concerned, Taoists were skeptical about the possibility of state and society helping man realize his best ends. They lived withdrawn from society, aloof from the activities of men.

Or fame or life,
  Which do you hold more dear?
Or life or wealth,
  To which would you adhere?
Keep life and lose those other things;
Keep them and lose your life—which brings
  Sorrow and pain more near?

Thus we may see,
Who cleaves to fame
  Rejects what is more great;
Who loves large stores
  Gives up the richer state.

CONFUCIANISM. The greatest figure in Chinese religious experience, Confucius (551–478 B.C.), was born in a small village in the Shantung Peninsula and belonged to a well-to-do family of ancient and respected lineage. His spiritual and intellectual growth was gradual; he never passed through a sudden religious conversion as have so many other leaders. He traveled widely, observed much, and reflected constantly upon the ways of men and the evils of society during the Feudal Age.

A visit to court resulted in his becoming public minister under the ruler of Lu; but Confucius was a literary rather than a political figure. His name is associated with some remarkable writings, the Five Classics, which include the *Book of History*, *Spring and Autumn Annals*, *Book of Odes*, *Book of Changes*, and *Book of Rites*. His disciples also collected his ethical teachings in the *Analects*. These writings are of the utmost importance in the history of Chinese civilization, for down to our own time they have guided the Chinese in practical morals. Confucius gradually

[1] These quotations are from O. Karrer, *Religions of Mankind*, pp. 38, 39–40, Sheed & Ward, Inc., New York, 1936.

extended his influence and steadily gained disciples, who carried his teachings far and wide. Dying at the age of seventy-three, he was buried with his ancestors in Shantung.

Confucius' religious philosophy stressed ethical relationships and, unlike that of Mahavira and Gautama in India, avoided contemplative and mystic flights. Confucianism was essentially a religion of good manners and good morals. Manners and morals were understood, however, to be far more than mere external things. There was to be a perfect harmony between one's manners and morals and one's inner kindliness of disposition. Children were to obey their parents and husbands and wives to respect each other. Respect was to be accorded also to ancestors; in fact, Confucius so greatly strengthened ancestor worship that it became a characteristic feature of Chinese thought and life. The philosophy of respect was extended to include all classes: neighbors should be polite to and respectful of each other; subjects were taught to be deferential toward their rulers, officers, ministers; rulers were to respect their humbler subjects; and the upper classes were to set an example for the lower classes. Although Confucius believed in a monotheistic power governing the world, his teaching never stressed this point. To Confucius, religion was mainly a thing of this world. "He had faith in man, man made for society, but he did not care to follow him out of society, nor to present to him motives of conduct derived from the consideration of a future state."

Confucius taught the vital principles of his philosophy in pithy maxims. The master had a special gift for fashioning them so that they would appeal to the Chinese. "To give oneself," he said, "earnestly to the duties due to men and, while respecting spiritual beings, to keep aloof from them—that may be called wisdom." The following saying is our golden rule stated negatively: "What you do not like when done to yourself, do not do to others." Regarding the attitude toward parents, he declared, "The services of love and reverence to parents when alive and those of grief and sorrow for them when dead—these completely discharge the fundamental duty of living men." Education, so dear to his heart, was of immense practical social and political importance. "Learning," he said "undigested by thought, is labor lost; thought, unassisted by learning, is perilous." Such maxims as "The cautious seldom err" were taught in school, and much of Chinese scholarship consisted in committing to memory the sayings found in the writings of Confucius and his disciples.

Philosophy of Mencius. Meng-tse, or Mencius, the Latinized name by which he is best known to Westerners, continued the teaching of Confucius. Living from 372 to 289 B.C., he was instructed by a grandson of Confucius and became imbued with the earnest desire "to be like

Confucius." In one of his writings Mencius expresses his views on virtue as follows:

> Heaven produced mankind
> Having faculties and having laws.
> These are invariable for the people to hold,
> And they love this admirable virtue.

His views on government are especially instructive.

> He who outrages human-heartedness is called a robber; He who outrages righteousness is called a ruffian. The robber and ruffian is a mere fellow. I have heard of the putting to death of the fellow Chou, last tyrannical ruler of the Shang Dynasty, but I have never heard that this was assassinating a ruler.

This means that if an emperor rules unjustly he may rightfully be deposed. Mencius, however, possessed a deep conviction that men by nature are good; hence the following advice to a ruler:

> Treat as befits old age the elders in your own family, so as to extend this treatment to the elders of others; treat as befits youth the young in your own family, so as to extend this treatment to the young of others; do this and the empire may be made to revolve in your hand.

The question has often been raised whether Confucianism was a religion or not. It was really a system of ethics with a minimum of religion. Confucianism, through its emphasis upon filial piety, politeness, and teaching by example, was destined to become a powerful buttress of the imperial state. The Chinese derived their more basic ideas about the gods from the religions that existed before Confucius' days. There was little sympathy between the Confucians and the Taoists. The Taoists condemned the political religion and the morality of the Confucians, who in return disapproved the cult of a supreme being and the mysticism and quietism of the Taoists. Later, during the first century A.D., Buddhism began to influence China and made the religious situation still more complex. The Chinese were a tolerant and practical people who did not hesitate to draw elements from the various religions even if those elements did not harmonize very well.

Founding of the Chinese Empire. The notable changes in Chinese philosophies and religious beliefs described above were followed several centuries later by far-reaching political revolutions. The Ch'in Dynasty, which ruled from 255 to 206 B.C. over the province of Ch'in, from which the word China is derived, fell heir to the peculiarly feudal organization of the country dating from just before the days of Confucius. The great Ch'in ruler Shih Huang (246–210 B.C.) ended the power of princes and provincial rulers and took political control into his own hands (221 B.C.).

He created the Chinese Empire and laid the firm foundation of its subsequent greatness. During the Han Dynasty, which governed China from 206 B.C. to A.D. 221, the empire included Manchuria, the three valleys of the Hwang Ho and the Yangtze and Si rivers, and the vast inland region to the west between the Kunlun and the Tien Shan ranges, known as Sinkiang or Chinese Turkestan. Peace reigned, commerce flourished, population increased, and the Chinese rapidly assumed a leading role in civilizing Asia.

Art of the Han Dynasty. Proof of the remarkable cultural progress of China under the Han Dynasty may be seen in the art of the period. Although much archaeological excavation remains to be done, some adequate idea of this art can be formed at the present time. It is interesting to note that neither Confucianism nor Taoism favored the development of temples or sculpture, for devotion to ancestors demanded only simple rites. Taoist quietism was extremely hostile to artistic representation of the Universal Spirit, which to them was so holy that they would not define it. Art was limited to the decoration of mortuary chambers and the engraving of dedicatory slabs of stone.

What is striking about the art of the Han Dynasty is the almost complete absence of religious motifs. The dead were interred amid sculptured scenes of everyday life representing historical events, mythological themes, or spirited hunting and battle scenes, all cut in low relief. Carved figures were set around the corpse as if to give pleasure and assistance to the spirit; naturalism was the dominant characteristic of this funeral art. The dead were interred, shrouded in rich silken garments, with everyday articles at hand for their convenience. In the dry desert sands of Mongolia and Chinese Turkestan the tombs explored have yielded rich treasure. Exhumed silken fabrics with intricate patterns are of fine quality and show great artistic skill. Animal figures predominate—birds and beasts, dragon and phoenix—as well as equestrian figures. Some of the tomb hangings were of Iranian workmanship; others show Greek designs. China under the Han Dynasty was far advanced culturally and maintained contacts with her remote western neighbors.

Early Inventions. Chinese handicraftsmen enjoy a well-deserved reputation for versatility, showing themselves to be inventive (though also imitative) and efficient workmen. During the Ch'in Dynasty there appeared a system of uniform weights and measures, valid throughout the entire empire. Laws were passed requiring axles of a standard width so that carts of every part of the empire could be accommodated on the imperial roads. By the time of the Han Dynasty a number of remarkable inventions were made, one of which was the *pi*, or brush made of hair; this proved useful in writing and painting. An ink was produced by mixing wood ashes with a glutinous binder. Paper was manufactured from

a variety of fibrous substances such as mulberry bark, rice straw, rags, or hemp and soon replaced slips of bamboo wood or silk. The water mill was invented, independently, it appears, of Western discoveries.

Another remarkable achievement of the Chinese was the Chinese Wall. Built over a period of centuries to guard the frontier and ward off attacks by nomadic Huns, it was finished in 221 B.C. by Shih Huang of the Chou Dynasty. The wall, provided with crenelations and towers, stretches for 1,250 miles across the hills, rivers, deserts, and plains, like a great stone dragon ever on guard.

Chinese Writing. The origins of Chinese writing are lost in the dim antiquity of the Shang Dynasty; but, somewhere along the cultural road, the learned evolved a picture writing. Gradually through the centuries these pictographs underwent significant changes, and conventional ideographs came into use. Finally, by the time of the Han Dynasty, there had been perfected the system of characters that Chinese writing was to retain until modern times. With all their inventive skill, the Chinese never developed an alphabet, which makes it difficult for people used to that language convenience to understand Chinese writing. Over 55,000 signs confront the dismayed student; but fortunately many signs are archaic, and thus the modern businessman finds that 4,000 signs suffice for all ordinary uses.

The cultural labors of the people of India and China in ancient, medieval, and modern times have influenced millions of human beings, not only within, but far beyond, the borders of Asia. To know something about these achievements is the obligation of every person who wishes to be an understanding participant in our own cultural achievements. But a knowledge of oriental history is valuable for another and probably even more vital reason: the study of so foreign a culture helps us to compare our own civilization with others that are very different and thus to attain a better understanding and deeper appreciation of the creations of all mankind. We may then scrutinize our own culture in the mirror of all humanity.

FOR FURTHER READING

Creel, H. G.: *Sinism: A Study of the Evolution of the Chinese World-view*
Crow, Carl: *Master Kung: The Story of Confucius*
Deussen, Paul: *The Philosophy of the Upanishads*
Farquahar, J. N.: *An Outline of the Religions of India*
Fitzgerald, C. P.: *China: A Short Cultural History*
Fung Y. L.: *A History of Chinese Philosophy*, Vol. I
Giles, H. A.: *Confucianism and Its Rivals*
Gowen, H. H.: *A History of Indian Literature*
Granet, Marcel: *Festivals and Songs of Ancient China*
Havel, E. B.: *Indian Architecture*
———: *Indian Sculpture and Painting*
Hopkins, E. W.: *The Religions of India*

Hsu, L. S.: *The Political Philosophy of Confucius*
Keith, A. B.: *Buddhist Philosophy in India and Ceylon*
Legge, James: *The Religions of China*
Macdonell, A. A.: *India's Past: A Survey of Her Literatures, Religions, Languages, and Antiquities*
Macdonell, A. M.: *A History of Sanskrit Literature*
Parker, E. H.: *Studies in Chinese Religion*
Sansom, G. B.: *Japan: A Short Cultural History*
Soothill, W. E.: *The Three Religions of China*
Stevenson, Mrs. Sinclair: *The Heart of Jainism*
Thomas, E. J.: *A History of Buddhist Thought*
Wilhelm, Richard: *A Short History of Chinese Civilization*

Chapter IX

FOUNDATIONS OF GREEK CIVILIZATION

We are all Greeks. Our laws, our literature, our religion, our arts, have their root in Greece.—Percy Bysshe Shelly, Preface to *Hellas*

HELLAS, where the Greeks found new homes after they came from the north, demands careful study if we wish to comprehend the character of Greek civilization. Geography plays a vital part in the life of any people; in the case of the Greeks it was all-important. Ancient Greece included the entire peninsula occupied by the present Greek kingdom, together with the seacoast of Asia Minor and the islands of the Aegean Sea. The peninsula, covered with forests and low mountains, was cut up into countless small districts often sharply divided from each other. Attica, Laconia, Messenia, Boeotia, and Thessaly were a few of the larger and more important. Each had a marked individuality; in fact, diversity was a chief feature of ancient Hellas. Further, the seacoast was deeply indented so that the country had an inordinately long shore and numerous harbors. Hence, even the most remote parts enjoyed easy access to the sea, which lay open to the inhabitants, constantly beckoning them to seek fortunes in distant lands. All these were decisive factors in the formation of Greek civilization. The cut-up character of the land favored the development of isolated city-states; access to the sea lured the Greeks to become a great maritime people.

Cretans, or Minoans. The seeds of Greek civilization originally came from Crete, an island to the south equally accessible to Egypt, Greece, and the northwestern part of the Fertile Crescent. Here lived a people of unknown origin, who emerged from the rudeness of the Neolithic Age about 3400 B.C. and, adopting the ideas of Egypt and the Tigris-Euphrates Valley, created a culture of their own. The Cretans, or Minoans, practiced an advanced type of agriculture, cultivating vines, plants, and fruit trees. They manufactured fine vases, glazed earthenware, glass objects, toilet articles, tools and weapons, statuettes for religious purposes, and fine cloth. They carried on a vigorous trade with economically backward peoples to the north, enjoying a monopoly until supplanted by the Phoenicians. Politically, Crete was divided into small communities, or city-states, of which Knossos, Phaistos, Gortyna, and Gournia were the most prominent.

Cretan, or Minoan, civilization, as it is usually called, lasted from about 3400 to 1200 B.C., a span that archaeologists have divided into three periods. The Early Minoan (3400–2100 B.C.) began with the appearance of copper and ended when bronze came into use. Picture writing was widely employed, and trade flourished. The Middle Minoan (2100–1600 B.C.) witnessed a magnificent development of the arts, revealed by the patient digging of archaeologists among the ruins of the palace at Knossos. The interiors were sumptuously decorated with an unusual nicety of taste that is reflected in the designs even of the pots and pans.

Cretan craftsmen manufactured the beautifully thin, exquisitely decorated Kamares ware, perhaps the finest pottery so far produced. Cretan houses had the amenities of several stories, spacious halls, paved floors, and an astonishingly modern drainage system. Life became luxurious, the gold- and silversmith's art flourished, and the highest artistic excellence was long maintained with respect to interior fresco decoration, furniture, ceramics, and other objects used in daily life.

For greater convenience, the earlier picture writing was simplified to about one hundred conventional signs. Vast quantities of clay tablets have been unearthed, testifying to the many-sided activities of the government in business and administration. A profitable trade was carried on with Egypt and other lands, especially the Troad, as the country around Troy was called, and that part of Greece known as Lacedaemon.

Religion flourished, a fertility goddess like the Babylonian Ishtar being most widely worshiped. The Late Minoan (1600–1200 B.C.) marked both the peak of cultural development and its final stagnation. The chief agent of deterioration was the unwarlike nature of the people. During the centuries the men of Crete, fancying themselves secure in their advantageous economic position, grew soft and neglected their defenses. The energetic Achaeans and then the Dorians took advantage of the opportunity, sacked the Cretan cities, and ended the island's cultural influence. Such is the story in brief. We must wait until the scholars have learned to decipher the Cretan script for the details of the life, culture, and conquest of the Cretan people.

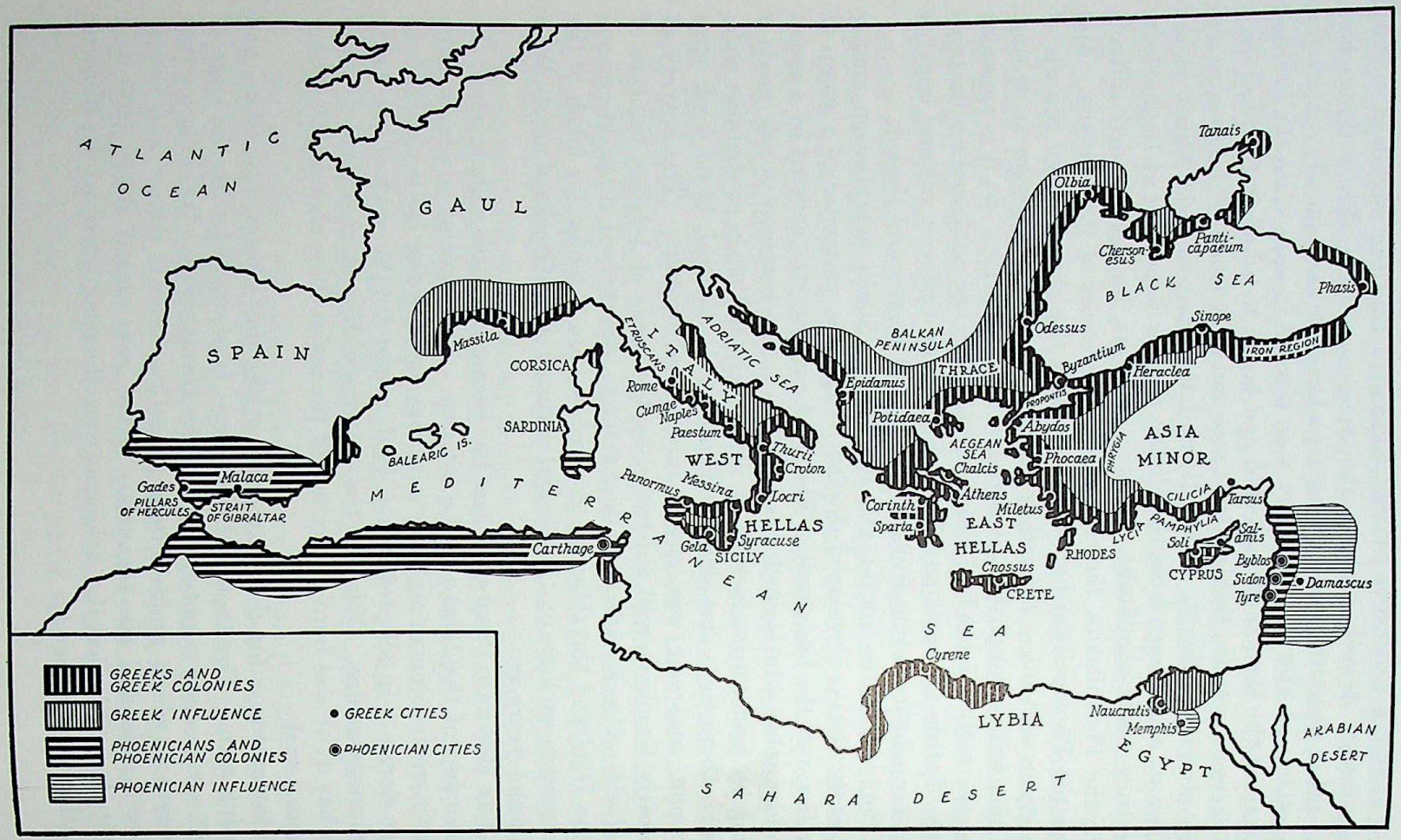
Minoan culture expanded northward during its last period, vigorously spreading over the Greek mainland and into Macedonia, Troy, and the islands of the Aegean. This expanded culture has been called the Mycenaean, from Mycenae, but it also flourished as luxuriantly at Tiryns and other centers. It is best illustrated by splendid objects such as swords, daggers, jewels, carved ivories, and vases found in tombs. Especially interesting as examples of Mycenaean work are two gold cups, found at Vaphio near Sparta, on the sides of which appear in the finest workmanship scenes of a wild-bull hunt.

Cultural Contacts of the Greeks. Into the advanced cultural environment described above the Achaean Greeks thrust themselves. Like other uncouth peoples, they plundered indiscriminately, destroying Mycenae and Tiryns. But they soon learned to appreciate the brilliant culture of the land they subjected and began to adopt it for their own. An energetic people, they raided Crete and the islands of the Aegean and even plundered Egypt. They harried the coast of Asia Minor before 1200 B.C., as we learn from the Hittite records discovered at Boghazkeui. Yet they made significant economic progress, for they traded actively with the Phoenicians, the commercial successors of the Cretans. Also from the Phoenicians the Greeks acquired the alphabet and the use of the stylus and ink. Soon they reduced their own language to writing. All this was accomplished, it appears, before 900 B.C. So it is apparent that the early Greeks had close contacts with the advanced civilizations of the Fertile Crescent and Tigris-Euphrates Valley, a cultural impetus that brought forth rich fruits in the days of Homer and Hesiod.

Political and Social Organization. Social organization among the early Greeks developed slowly. The tribe, composed of a group of families, was the basic unit. The chief, or king, was assisted by a group of older men, who served as councilors. The common people made a living by trade, manufacture, or agriculture and often existed like serfs, though there were also slaves. Fighting was general, blood feuds were common, and war was waged fiercely and brutally. The bravery of the early Greeks is well illustrated by the deeds of Achilles, the hero of the *Iliad*. Greek society of about 800 B.C. is portrayed in the epic poems of the *Iliad* and the *Odyssey*, to which we are indebted for much of the information we have on the life and customs of the Greeks of nearly three thousand years ago.

The Homeric Poems. There has been much futile dispute about the authorship of the *Iliad* and the *Odyssey*. These poems possess striking artistic unity even though the poet may have drawn his materials from older stories. In all probability, both poems are the work of one writer of supreme genius. Whether the writer was Homer, was blind as tradition has it, or was born in any one of the seven cities claiming the honor is immaterial.

Homer wrote for the aristocracy of the day—kings, councilors, and fighting men. The theme of his poems is associated with the siege of Troy, a city-state situated south of the Dardanelles. We do know that this center, which profited from an active trade in copper and bronze between Asia and the Danubian region, was sacked about 1200 B.C., and it is possible that the Achaeans were the conquerors, as the Homeric tradition would have it.



MAP X.—Era of Greek colonization.

The *Iliad* deals with the wrath of the hero Achilles during the siege of Troy. The *Odyssey* tells how Odysseus, or Ulysses, wandered over the Mediterranean after the destruction of Troy. Continually thwarted on his journey by the hatred of Poseidon, god of the sea, he survives many adventures to return at last to his home on the island of Ithaca.

Such poetry, woven around the deeds of an ideal character, is called epic and is usually the product of a fighting aristocracy. Thus Anglo-Saxon England had its *Beowulf*, France its *Chanson de Roland*, and Germany its *Nibelungenlied*. But the *Iliad* and the *Odyssey* are especially interesting because they stand at the very threshold of European history and, with the Rig-Veda, constitute the earliest surviving literary monuments of peoples speaking an Indo-European language. They describe the cultural activity of a society at the opening of the Iron Age—in that lies their chief significance for us, though they also are of the highest order of poetic excellence.

Each poem comprises twenty-four books, the *Iliad* being the longer. The episodic form has always been popular and has repeatedly been employed by later writers, one of the most successful being the Roman Vergil in *The Aeneid*. The structure and meter have been imitated by Longfellow in *Evangeline*. Each line is composed of six feet divided into two parts by a pause, or caesura, and each foot contains three syllables, one long and two short, or two syllables, both long. The following verses from the *Iliad* (Book III, lines 234–244), translated by Hawtrey, are the words of "long-robed Helen, fair among women" as she stood on the walls of Troy looking down upon the Achaean hosts:

Clearly the rest I behold of the dark-eyed sons of Achaea,
Known to me well are the faces of all; their names I remember;
Two, two only remain, whom I see not among the commanders,
Castor, fleet in the car,—Polydeuces, brave with the cestus,
Own dear brethren of mine,—one parent loved us as infants,—
Are they not here in the host, from the shores of loved Lacaedemon?
Or, though they came with the rest in ships that bound through the water,
Dare they not enter the fight, or stand in the council of heroes,
All for fear of the shame and the taunts my crime has awakened?

> So said she—they long since in Earth's soft arms
> were reposing,
> There, in their own dear land, their fatherland,
> Lacaedemon.

HESIOD. After Homer came another significant poet, Hesiod, who wrote between 750 and 700 B.C. Living on a farm in Boeotia in central Greece on the slopes of Helicon, he had interests very different from those of Homer. As a farmer who knew how hard it was to wrest a living from the stubborn soil, he cared little about idealized heroes of the Trojan War. His *Works and Days* tells us of the thoughts of Greek peasants and is filled with the homely and practical love of a worker of the soil. It gives advice about raising crops, caring for animals, and meeting the hardships incidental to life lived in continual conflict with nature.

Hesiod also wrote the *Theogony*, a genealogy of the great number of gods to whom the early Greeks gave their devotion. To the Greeks the gods seemed like human beings, but braver, wiser, and more successful in meeting the problems of the world. Endowed with human personality, they appeared as men and mingled freely with human beings. A race of demigods sprang from unions between gods and human beings. Zeus revealed himself in the flash of lightning and the roll of thunder, Poseidon ruled the sea, Demeter caused seed to sprout and grow into corn, Hestia protected the hearth, Hades was god of the dead, Hera was the jealous wife of Zeus. Zeus's children were Ares, god of war; Apollo, god of light; Hephaestus, god of fire; Dionysus, god of the vine; Athena, goddess of the arts; and Aphrodite, goddess of love. Greek mythology provided, down the centuries, the themes for poetry, art, and philosophic thought, and it must therefore be familiar to every educated person. Moreover, the true character of early Greek thought and deed is best revealed by what the Greeks said about their gods and the way in which they honored them.

GREEK ECONOMIC LIFE. The *Iliad* and the *Odyssey* show us that early Greek economic life rested primarily upon agriculture. Wheat and barley were the basic grains; millet also was grown, and orchards produced figs, olives, pears, and apples. Scarcely less important were the vineyards from which the Greeks pressed large varieties of wine, whose superior virtues were lauded by their poets. Much attention was given to the raising of livestock. We encounter allusions to cows, oxen, bulls, and heifers; rams, ewes, and lambs; horses, mares, foals, and mules; hogs and sows; goats and kids; swarms of bees; and geese. So long as the forests remained extensive, this food supply was supplemented by the chase. The Greeks loved to hunt deer, boars, hares, and wild goats and engaged in the more exciting and dangerous pursuit of bears, wolves,

and lions. Fishing was a favorite and profitable occupation made possible by the ever-accessible sea.

This rude plenty was supplemented by industry, which remained domestic and therefore rudimentary. The early Greeks cleared forests, thus constantly adding to their vineyards and grainfields. Women and girls spun yarn and wove cloth for domestic use. Homer's *Odyssey* gives a picture of Penelope weaving cloth while faithfully waiting for Ulysses' return. There was a limited commerce in cloth and leather goods. Smiths produced weapons of bronze and iron. Homeric society keenly appreciated good workmanship, as one may glean from the description of Achilles' shield in Book XXIII of the *Iliad*. There was much demand for articles of luxury made from gold, silver, or copper, as well as for objects set with jewels.

But commerce in its fullest sense remained restricted. The Greeks were still agricultural; most of their wealth came from the soil. Actual trading was carried on chiefly by the Phoenicians, whose ships sailed along the bays and inlets of the Greek coasts. It was to be many years before they experienced real competition from native Greek traders.

Great economic progress marked the centuries following the days of Homer and Hesiod. Commerce grew, agriculture flourished, population increased, and the tribal villages such as Homer describes grew into small towns. Soon there seemed to be too many people in the homeland. Ancestral estates were repeatedly subdivided so that they were insufficient to support families in their traditional opulence. Many Greeks before 600 B.C. settled as colonists in suitable trading places on the shores of the Black Sea, the Aegean, and all parts of the Mediterranean where opportunity to carry on agriculture or establish trade presented itself. By 600 B.C. the coast of these waters was dotted with thriving communities, some of the more famous being Syracuse in Sicily, Naples in Italy, Massilia (Marseille) in Gaul, Cyrene in Africa, and Naucratis in Egypt. These settlements tapped the raw materials of neighboring regions, exchanging articles of Greek manufacture for them. A busy trade sprang up; soon the Greeks crowded out the Phoenicians and even the merchants of Carthage, who fancied they had a secure monopoly of trade in the west. All this was important, for it provided the economic basis on which the supremely original culture of sixth century Greece securely rested.

Social Changes from 700 to 500 B.C. With the introduction of coined money, vast social changes took place. Population grew even more rapidly; the little tribal villages became large, busy towns throve by exporting manufactured ware, and soon the city-state, or *polis*, came into existence. It was on the city-state organization that the Greeks and later the Romans developed their civilization. The word *city-state*

implies that the political group in which the Greeks lived was a city which possessed the features of a state. A city-state had the following characteristics: (1) It was small in area, being restricted to the city and the dependent country immediately around it, as in the case of Athens, Corinth, and Sparta. (2) It had a common civic center often built around a rock fortified, like the Acropolis of Athens or of Corinth. (3) It had a governing organization in which the free citizens participated.

In such states, free Greeks took an active interest in all aspects of public life, such as politics, religion, commerce, industry, and art. The free Greek was intellectually keen and curious, ever developing his mental powers. In contrast, the Egyptians, whose Pharaohs were gods, and the Babylonians, whose gods were represented by kings, were obedient slaves of the state, rarely questioning policies of government. Life in the polis made for freedom and individuality; thus, the Greek city-state became one of the important political creations of antiquity.

Sparta. Sparta, the largest city-state of Greece, with an area of 3,360 square miles, ruled over Lacedaemon and Messenia. Dorian forefathers of the Spartans had reduced to slavery the more numerous native population, called *helots*, who naturally became dangerous enemies. To maintain control, the Spartans organized their city-state like a camp. All life was subordinated to the army. At birth, boys were presented before a kind of medical tribunal that decided which infants should be allowed to live. Only those who promised to become fit soldiers were spared. From the age of seven they lived in barracks and at twenty began a rigid military training. Between thirty and sixty, they served actively in the army. Women, too, received a severe physical training.

Some noble qualities were developed, such as loyalty, obedience, and bravery, but the Spartans had a reputation, among the Athenians at least, of being dull and uncouth. Unlike Athens, Sparta created nothing very significant for civilization and did little to develop the creative talents and intellect of its subjects. We need not trouble ourselves further with this city-state except to point to the drawbacks that military communism holds for civilization. In Athens the citizens regarded war as an occasional business, an evil to be shunned; and commerce, the arts of peace, and the development of the intellect occupied their attention. Consequently, theirs was the more significant contribution to Greek civilization.

Popular Revolutions in Athens: Draco, Solon, and Cleisthenes. Throughout Greece, merchants became rich and towns grew rapidly, but the peasants became poorer and poorer. As money became more plentiful because of trade and industry, the price of living rose and peasants found they could not sell their crops in competition with foodstuffs produced in distant lands, which merchants took in trade and sold in the home market. In both town and country, the poorer classes

felt the pinch of a growing poverty. In Attica, the free farmers virtually vanished. The farming class became much like the serfs of medieval times. To make matters worse, nobles who owned most of the property governed the city-states and acted as judges, interpreting the law to their own advantage.

Such conditions produced discontent, which led to violence. In Athens a demand was made to codify the unwritten regulations, flagrantly misused to the profit of the nobles, so that all might know what the law actually was. This task was entrusted to Draco about 624 B.C.; so severe was his interpretation that the word "draconian" has become a synonym for excessive harshness. Thirty years later, the poet Solon was elected archon, one of the heads of the civil government in Athens, and to him was given the task of reform. He canceled the debts, which threatened to reduce people to slavery, abolished mortgages, codified the laws anew in a juster manner, and produced a constitution that left the wealthy safely in control of the government.

In spite of their economically liberal character, Solon's reforms did not bring peace to Athens, and dissensions continued. Finally, about 500 B.C., Cleisthenes revamped the Athenian state. He abolished the old tribes, substituting ten new ones, seeking to blot out old tribal prejudices, which were still very strong. The council, or *boule*, of 500 men chosen by lot, fifty from each of the ten tribes, was an executive and administrative body. It prepared legislation for the popular assembly, or *ecclesia*, which was composed of all citizens over twenty years of age. The entire council was not always in session, one group of fifty being appointed each month to have charge of the government for that period. The new army also was drawn from the ten tribes, each of which elected one general.

The constitution of Athens, now completely democratic, was more or less typical of the government of the best Greek city-states. But we should especially note one more remarkable feature—every Athenian citizen had a direct share in the government and a definite stake in its welfare and thus felt that it was a great privilege to be a citizen of Athens, far greater than to be a member of a mere tribe. In this manner was born the intense, practical patriotism of Athens and of other Greek city-states.

Stages in Growth of the City-State. Four stages are to be noted in the development of city-states. The first is represented by the tribal community as described in Homer's *Iliad* and *Odyssey*. The second is marked by the ascendancy of the nobles, who tended to deprive the kings of their power. The third is one of struggle between people and nobles, characterized by the rise of tyrants supported by the people because of promises made them. The word "tyrant" meant merely

one who seized power unlawfully, not one who was "tyrannical" in the present meaning of the word. As a matter of fact, tyrants were capable rulers. The period of Pisistratus, who gained control of Athens after Solon had reformed the government and who ruled from 546 to 527 B.C., was one of great progress. He built temples, decorated them with statues, developed economic life, encouraged trade by sea, favored literature, and is said to have prepared the definitive texts of Homer's *Iliad* and *Odyssey*. Some tyrants, however, ruled despotically, and it was they who made the word "tyrant" hateful. Thus Pisistratus' son Hippias, who ruled harshly, was finally expelled, whereupon Cleisthenes reformed the Athenian state. The fourth stage is the true democracy of the free citizens, the period of Athenian leadership in politics, economic life, and the finer arts of civilization.

THE PERSIAN WARS. Scarcely had a democratic city-state been created in Attica when the Athenians were forced to defend it with their blood. The Persian Empire, the most extensive empire yet established by any ruler, pushed its borders to the Aegean Sea by conquering the kingdom of Lydia. The numerous Greek communities that fringed the coast of Asia Minor and were subject to Lydia fell into Persian hands. But so intense was their love for freedom that Greeks could never become loyal subjects of a world empire like Persia. Supported by Athens, they revolted and in an expedition against Sardis, the capital of Lydia, burned the city. Darius the Great (558–485 B.C.), King of Persia, resolved to punish the rebels. He defeated them in the great sea battle of Lade in 494 B.C. and pushed on to have an accounting with Athens, whose capture he believed would result in the subjection of all Greeks.

Thus opened a struggle that has ever been memorable in the history of the West—a contest between two great but very different types of civilization. On the one hand was the Greek city-state life, with its atmosphere of freedom favorable to every aspect of culture generated in liberty. Opposed were the forces of an older, oriental civilization, in which the extraordinary freedom of Greeks could find no place. The Persian Empire continued the political ideals of Egypt and Babylon, which were governed by absolute and divine rulers, the very antithesis of all free activity that the Greek city-states exemplified. The struggle between Athens and Persia, therefore, was epochal; the issue was whether the thought and ideals of Asiatic civilization would determine the future of Western culture or whether the West would pursue an independent course.

Darius's first attempt to invade Greece (492 B.C.) failed. The second was thwarted even more ignominiously at the Battle of Marathon in 490 B.C. on the coast of Attica. The Greeks were well aware of the historic implications of the contest. Miltiades, one of the commanders,

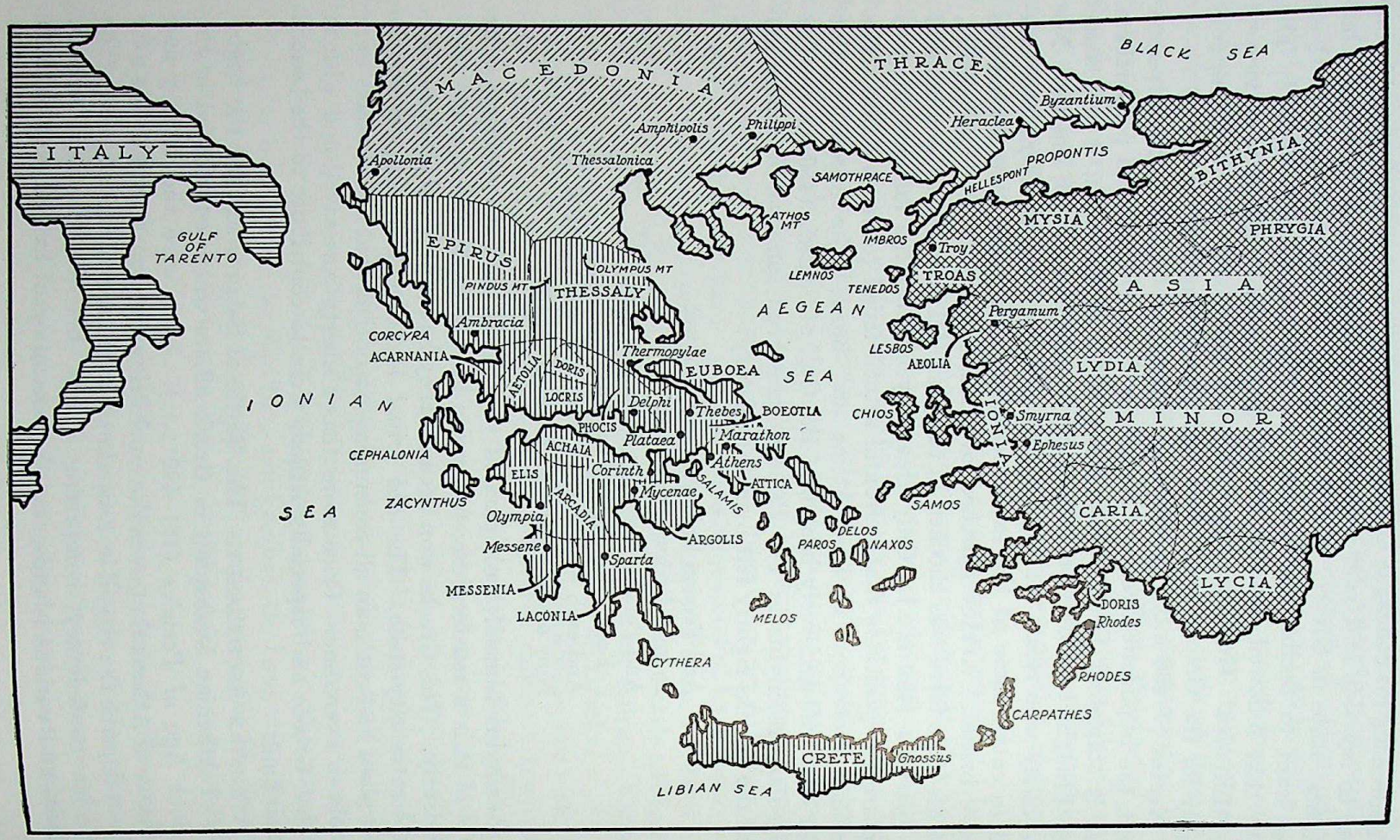
in addressing his colleague Callimachus said, "You have only to add your vote to my side and your country will be free, and not free only, but the first state in Greece. Or, if you prefer to give your vote to those who want to decline the combat, then the reverse will follow." The fight that followed between the unequal armies resulted in a victory for Miltiades. Greek independence was saved and with it the opportunity for the Greeks to develop their own civilization.

Xerxes (?–466 B.C.), successor of Darius the Great, next resolved to crush the impudent Greeks. He prepared an army of such proportions that it staggered Greek imagination. Two million men, it was said, were brought together; but the figure no doubt was much smaller. No one today who reads the thrilling pages of the historian Herodotus can fail to catch some of the excitement and enthusiasm that stirred the Greek breast. Xerxes marched overland by way of the Dardanelles, but his huge force was checked in the pass of Thermopylae by a handful of Spartans (480 B.C.). Only treachery enabled the haughty king to capture the positions that a frontal attack failed to break down. The Persians thereupon ravaged Attica and burned the Acropolis. But their fleet was decisively beaten in the Gulf of Salamis (480 B.C.). The tragedian Aeschylus in *The Persians* preserved some of the exultation that the Greeks rightly felt over this victory:

> And Persian beds with tears are wet
> In grief for husbands gone,
> And Persian wives are delicate in grief,
> Each yearning for her lord;
> And each who sent her warrior-spouse to battle
> Now mourns at home in dreary solitude.

Aeschylus himself took part in the battle, and the description he gives of it is a masterpiece; few poets have ever described a battle so effectively. The Greeks won because they had a personal stake in their democratic city-state. The old tribal loyalties had disappeared; in their place had come an all-consuming patriotism that the Persians were unable to overcome. Once more Greek liberty was saved and with it all that Greece and especially Athens were to contribute to the benefit of mankind.

Athenian Ascendancy. The Battle of Salamis marked the beginning of Athenian leadership in Greek affairs which culminated in the glorious Age of Pericles (461–429 B.C.). Such were the vitality and brilliance of Athens that even the cruel Peloponnesian War (431–404 B.C.) did not deprive the city of its ascendancy in matters of the intellect. The Athenian confederacy, comprising Attica, Boeotia, Thessaly, Argolis, Achaia, and various islands, was an association of free city-states, with



MAP XI.—Greece and the adjacent regions.

Athens directing the external affairs of each and sometimes interfering in internal matters. The allies of Athens, really subject to her, paid a tribute in ships and money. But so dearly did the Greeks love freedom that they soon began to object even to Athenian dictation in spite of the fact that all profited from this combination and commerce and economic welfare developed rapidly. Athenians grew rich from their trade in pottery, wine, olive oil, and cloth, until the exhausting Peloponnesian War blighted their material prosperity.

Diversity and Unity of Greece. Greece thus was an aggregation of city-states stretching from the eastern shores of the Black Sea to Cadiz on the Atlantic Ocean. Its center was the peninsula of Greece,

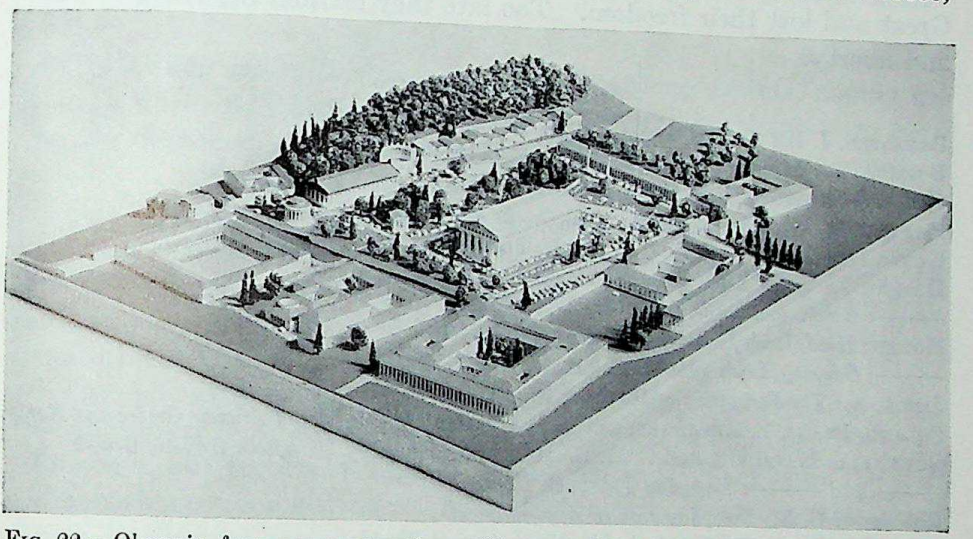


Fig. 22.—Olympia, from a reconstruction. (*Courtesy of the Metropolitan Museum of Art.*)

for there and on the islands of the Aegean Sea and its adjacent shores were all the great city-states save prosperous Syracuse in Sicily. The Greeks of the colonial city-states spoke the dialects of the homeland, worshiped the same gods, and had similar business interests. Everywhere Homer's poems were read and memorized, giving to the scattered Greeks the conviction that they all belonged to the same cultural group. Hesiod was read for his stories about the gods and goddesses, who lived on Mount Olympus and ruled the affairs of men.

The worship of Zeus became universal; from all parts of the Greek world, admirers went to his shrine at Olympia in Elis, where the first games in his honor were held in 776 B.C. Greeks also came from far and near to Delphi to learn secrets of state or the answers to questions of private concern. Guided by Apollo, the priestess sat in the sulphurous fumes of the temple, pronouncing oracles that were never doubted. At Epidaurus was the shrine of Asclepius, the healer god, to which came

the lame, the halt, and the blind. Trade and industry, the city-state, Homer's *Iliad* and *Odyssey*, Hesiod's *Theogony*, the common Greek language, the gods, the Olympic games, and the great shrines—all these gave the Greeks a feeling that they possessed a culture different from that of their neighbors, whom they called "barbarians."

A Fatal Defect in Greek Culture. But one serious defect in Greek civilization should be noted. This was the intense, destructive jealousy that prevailed among the city-states. Commercial and political rivalry resulted in long and disastrous wars. Impoverished by these conflicts and incapable of united, unselfish action, the Greeks were unable to defend themselves against powerful rulers like Alexander the Great and lost their freedom. Too late they learned the value of peace and liberty.

FOR FURTHER READING

Breasted, J. H.: *Ancient Times*, Chaps. IX–XII
Burn, A. R.: *Minoans, Philistines, and Greeks*, B.C. 1400–900
Capps, Edward: *From Homer to Theocritus*
Fowler, W. W.: *The City-State of the Greeks and Romans*
Glotz, Gustave: *The Greek City and Its Institutions*
Hesiod: *Theogony*, Loeb Classical Library
———: *Works and Days*, Loeb Classical Library
Homer: *Iliad*, Loeb Classical Library
———: *Odyssey*, Loeb Classical Library
Jarde, A.: *The Formation of the Greek People*
Poland, Franz, E. Reisinger, and R. A. Wagner: *The Culture of Ancient Greece and Rome*
Quennell, Marjorie, and C. H. B. Quennell: *Everyday Things in Archaic Greece*
——— and ———: *Everyday Things in Homeric Greece*
Robinson, C. E.: *Everyday Life in Ancient Greece*
Toutain, Jules: *The Economic Life of the Ancient World*

Chapter X

GREEK CIVILIZATION THROUGH ARISTOTLE

To break through custom by the sheer force of reflection, and so to make rational progress possible, was the intellectual feat of one people, the ancient Greeks; and it is at least highly doubtful if, without their leadership, a progressive civilization would have existed today.—R. R. Marett

GREEK civilization was, in its most striking aspects, mainly the work of Athenian genius. In the preceding chapter we have described the leadership of Athens and the basis on which it rested. It is important to realize that Greek civilization was made possible only by the free life of the citizens in the *polis*, or city-state. Poetry, education, drama, historical literature, oratory, art, science, and philosophy were generated by this life. These aspects of Greek civilization, including the political, illustrate what we may call the Greek attitude toward life.

The Ionian Greeks: Miletus. The first stages of Greek civilization, however, were developed by the Ionian Greeks of Miletus in Asia Minor and of Lesbos and Teos in the Aegean Sea. They were the first to embark on an independent trend of thought to which subsequent Greek intellectual activity owed much of its inspiration. The Ionian Greeks had long traded with Egypt and Phoenicia and had many opportunities to see new things and learn new ways of thinking from the peoples with whom they carried on business. The social and ethical concepts expressed by Homer and Hesiod became inadequate to the expanding life of 650 B.C.; these Greeks of Ionia and especially of Miletus were developing a cosmopolitan point of view.

Lyric Poetry. A new literary art discarded the stately style of Homer and Hesiod and gave fuller expression to the individual. This new verse form was the lyric, so called because the poems were recited to the accompaniment of a seven-stringed lyre; it proved very popular with the affluent inhabitants of the Ionian cities and the islands of the Aegean. It had many forms such as the elegy, or lament; the personal lyric of Lesbos; the choral lyric of the Dorians; the drinking songs of Anacreon; and Pindar's songs or odes of victory. Alcaeus and Sappho of Lesbos won great renown for their lyrical skill, Sappho gaining the reputation of being the greatest feminine poet of antiquity. She was

the center of a brilliant society in which women had an important part. The following song is representative of her verse:

Peer of gods he seemeth to me, the blissful
Man who sits and gazes at thee before him,
Close beside thee sits, and in silence
  Hears thee silverly speaking,

Laughing love's low laughter. Oh this, this only
Stirs the troubled heart in my breast to tremble!
For should I but see thee a little moment,
  Straight is my voice hushed;

Yea, my tongue is broken, and through and through me
'Neath the flesh impalpable fire runs tingling;
Nothing see mine eyes, and a noise of roaring
  Waves in my ear sounds;

Sweat runs down in rivers, a tremor seizes
All my limbs, and paler than grass in autumn
Caught by pains of menacing death, I falter,
  Lost in the love-trance.[1]

Anacreon of Teos won equal fame as a composer of drinking songs that exalt the present moment, for today knows not what ill tomorrow may bring. Unfortunately, only fragments of his verse have come down to us; but his spirit has been preserved in a series of anacreontic poems of which the following is a fair example:

  When I drink wine,
A god doth straight begin
To warm my soul within;
  When I drink wine,
Cares, plots, devices go
Where the wild sea-winds blow. . . .
  When I drink wine,
The gain's my own to keep
All share in death's long sleep.

Pindar (521–441 B.C.) was the greatest of Greek lyric poets. Born in provincial Thebes, he traveled far and wide. His faultless mastery of lyric verse made him a favorite at the courts of the tyrants. He was a genius possessing the most remarkable ability to produce infinite variety within the limits characteristic of lyric verse.

[1] Botsford, G., and E. Sihler (eds.), *Hellenic Civilization*, pp. 197–198, Columbia University Press, New York, 1929.

Pindar won universal acclaim for his odes celebrating victories in the Olympic games and other contests; for when an athlete gained a victory in racing, boxing, or any other event, it was expected that he should be praised, his family complimented, and any former successes of the athlete or of his relatives mentioned in a poem written for the occasion.

In general, lyric poetry was aristocratic, flourishing best at the courts of tyrants. It had nothing of the rugged harshness that tilling the soil gave to Hesiod's *Works and Days*. Lyric poetry, therefore, was not the expression of the solid, democratic Greek but the spume of the luxury-loving class tinged with a bit of orientalism.

Importance of Greek Education. In none of its activities did the Greek genius reveal itself more clearly than in the educational ideals and practices of the Greek city-states. Education is necessary because children are not born with a knowledge of culture or even with the reflex actions they must develop to share in the common life. It is a short cut whereby youth masters the existing culture of a people before sharing in its further creation. For this reason, as civilization grows more complex, formal education becomes indispensable. Athenian education and that of most Greek city-states possessed at least one novel feature. The youth in the days of Pericles (*d.* 429 B.C.) learned not only how to act in their relations with men but also to criticize established ways of thinking and of doing things. This intellectual questioning created new knowledge, tended to bring about new ways of thinking and acting. This revolutionary element in education can best be illustrated by briefly reviewing educational progress from early times.

During Paleolithic days when men were hunters, boys pursued wild animals and slew them, providing food for the group. In Neolithic times, boys had to learn how to till the soil, raise cattle, and make implements; girls were taught by their mothers how to weave, bake, and make butter and cheese. Such lessons learned by watching older men and women are very ancient and even in our day are of more basic importance than we may think. A similar education was common in Egypt and Mesopotamia, where children of serfs had to master the arts of an agricultural society. Special instruction was necessary only in training boys in religion and temple service. The priests attached to the temples of Sumer and Nineveh developed an extensive lore concerning medicine, mathematics, magic, astronomy, and astrology. But the bulk of the population composed of serfs tied to the soil had little if any share in this learning.

Before Pericles's day a large proportion of Athenians were free men; to perform their part in the life of a city-state, or polis, a certain amount of formal education was necessary. This was provided by private teachers and not by the polis. Boys learned poems, moral

sayings, and the many myths about gods and heroes. At six they passed under the supervision of a slave, or *paidagogus*, who kept them out of mischief. Much stress was laid on the reading of good literature, especially the poems of Homer and Hesiod. Thus a character in Xenophon's *Symposium* says; "Eager that I should be a good man, my father made me commit all the poems of Homer to memory." Boys also studied lyric poetry. Because this was accompanied by music, they learned to play on the lyre and participate in other musical exercises. Numbers were taught with the aid of the abacus, a ball frame still common in our schools a generation ago. So music and literature, the chief elements in education, were considered sufficient to prepare boys for an active life in the polis, although they also received a good physical training in the palaestra, which developed health and beauty and grace of body.

Education thus aimed to develop boys into intelligent human beings rather than into men who merely knew how to do a few practical things to gain a living; it was "humanistic" rather than "vocational."

This elementary education lasted until the fourteenth year when boys were freed from the supervision of the *paidagogus* but continued their training in the gymnasium, a place designed for mental as well as physical training. The boys of the more well-to-do Athenians next spent 2 years in the army of the city-state and so began their careers as useful citizens. Those of the poorer classes, in the meantime, passed through an apprenticeship, which gave them a chance to make a livelihood.

Spartan education was something very different. Most of the population of Lacedaemon was composed of serfs who were kept forcibly and brutally in subjection by the ruling Spartans. There was always danger that the exploited majority might exterminate their masters. For this as well as for other reasons, Spartan boys strove to be good soldiers. Taken from their homes at seven, they lived in state barracks, where they received systematic military training in carefully organized bands. Gymnastic exercise was not sport, as in Athens, but designed to create a hardy physique. Spartan boys learned to obey orders, endure pain, express no emotion, and avoid either small talk or learned conversation. Beginning with the twentieth year, youths were attached to companies of fifteen men each, with whom they took their meals. Poetry and music were taught, not for their aesthetic or intellectual value, but for their martial effect. Small wonder that Athenians thought the Spartans stupid! Unlike Athenian education, Spartan education exercised little or no influence in medieval and modern times.

Position of Women. Athens was very much a man's world, with little place in public life for women, whose real sphere was in the home. Mothers trained their daughters in domestic duties, taught them to

sing, and prepared them for the role of quiet housewives. Fathers arranged marriages without consulting their daughters' wishes. After marriage a woman was not supposed to appear in public without an escort. In Sparta, girls were given additional training in physical culture that they might develop robust bodies and become the mothers of healthy children. The lack of an intellectual education made most women the mental inferiors of their husbands, though this was not the rule in the Ionian cities of Asia Minor. There the women were accorded much more freedom, and society produced some brilliant feminine intellectuals, such as Sappho.

Tragic Drama. Tragic drama came into existence during the sixth century B.C. We can trace its history back to the simple songs that Greek peasants used to sing at the feasts of the gods. At the spring festival of Dionysus, the god of vegetation and life, singers walking in procession wore goatskins, masked their faces, and recited the story of the god's death and resurrection. Eventually the leader of the chorus acted a pantomime for the entertainment of the spectators, changing his masks in order to impersonate different characters. The tyrant Pisistratus introduced such plays into Athens, and the spring festival of Dionysus rapidly developed into tragic drama. The plays, produced in groups of three, or trilogies, were presented during the daytime, for there was no way of lighting the stage at night. The chorus moved in a semicircular area. Spectators sat on the hillside.

As the popularity of the festivals increased, more formal arrangements were made for their presentation—the familiar Greek amphitheater. The convenient hillside became a terraced horseshoe of marble benches, the lower tiers of which held individual chairs for the wealthy patrons. Aisles converged on the flat semicircular space called the "orchestra," where the chorus was grouped at either side and dancing took place in the middle. Along the diameter of the space was a raised stage backed by a stone wall called the *skene*, which acted both as sounding board and backdrop and usually simulated the façade of a temple or palace, with wings at either side and three or five doors giving access to the stage. There were no overhead borders or curtains, as on the modern stage, or mechanical accessories except the crane, or *mechane*, a device used to raise and lower the gods and goddesses onto the stage when only divine intervention could save the author's plot. From this custom the cynical Romans derived the phrase *deus ex machina*, or "god from a machine," to explain the solution of any problem by the intervention of the gods.

Aeschylus (*d.* 456 B.C.), the first of the great tragic poets, wrote somewhat in the Homeric style, his ideas reflecting the moral concepts of an older time. He possessed great dramatic power, being especially

gifted in portraying such women as Atossa and Clytemnestra. Conservative in religion, he depicted the gods as rebuking mortals and meting out proper punishment. He believed that fate ruled the acts of the gods and that law and justice should regulate human society. Aeschylus lived through the stirring days of the Greco-Persian Wars, and his love for freedom is admirably expressed in *The Persians*, in which he retold the victory at Salamis.

Sophocles (*d.* 406 B.C.) belonged to the age of Aeschylus. He too witnessed the Persian invasions and shared the popular interest in the new freedom. His style was less rugged, the range of his themes wider. He believed in a divine order in the world but rejected the idea of inexorable fate. Sophocles's plays are more complicated than those of Aeschylus; the latter introduced a second actor to support the leader and chorus, but Sophocles added a third. His *Oedipus Tyrannus* is perhaps the most perfect example of Greek tragedy, but his *Antigone* probably makes the most forceful appeal to modern audiences.

Very different from either Aeschylus or Sophocles, Euripides (*d.* 406 B.C.) abandoned their exalted style and represented his characters as human beings motivated by their own passions. Though he drew his themes from mythological tales, he treated the details so casually as to shock conservative Athenians, and as a result his reputation was not so high as that of Sophocles. Euripides thus voiced the newer skeptical ideas that flourished in Athens during the second half of the fifth century. His dramas really do not suffer in moral quality or artistic value on this account, and his reputation grew after his death. His *Medea*, *Iphigenia*, and *Phaedra* still create a powerful impression when presented on the modern stage. He exerted great influence on Seneca, who in turn became the model of Renaissance drama two thousand years later.

Comedy. Comedy grew out of the burlesque antics that attended the ribald festivals of Dionysus. Choruses were larger and actors more numerous than in the tragedies. Satire, mimicry, and ridicule spiced with indecency and low wit abounded. Nothing was too sacred to be portrayed on the stage. The greatest writer of comedy was Aristophanes (*d.* 388 B.C.). His skeptical spirit was much like that of Euripides, whose works, however, were never characterized by license or obscenity. In his *Clouds*, Aristophanes criticizes Socrates, whom he wrongly accuses of atheism; his *Frogs* attacks tragic poets in general; his *Birds* satirizes city life; his *Wasps* makes fun of the Athenians' love for lawsuits; and his *Lysistrata* deals with feminism.

Historical Literature. Its historical literature is one of the chief glories of Greek culture. Men who played an active part in the life of the city-state naturally were interested in the deeds of the past. The *Histories* of Herodotus (*d.* 424? B.C.) were written during the fifth century

shortly after the glorious victory of Salamis. An inquisitive and vivacious Greek from Ionia, Herodotus visited many parts of the then known world to satisfy his curiosity. He saw and heard much, and whatever he deemed interesting was set down in his nine books of *Histories*.

He tells what he knew of the Greek migrations, of the Persians and their great king Cyrus, of the conquest of Egypt and its strange wonders, of Scythia inhabited by the fierce nomads who fought on horseback and lived in wagons, of the lake dwellers of Thrace, of the Ionians and their quarrel with King Darius of Persia, of the Persian invasions in which Xerxes was defeated at Salamis, and of the final expulsion of the enemy. Herodotus, loved by all cultivated Greeks, has been called the "Father of History" and, whatever his faults, surely deserves the title.

Thucydides (*d.* 400 B.C.), an Athenian who belonged to the second half of the fifth century, followed the example of Herodotus; but his *Peloponnesian War* covering the years 431 to 411 B.C. is a very different kind of work from the *Histories*. He studied at first hand every aspect of the savage war between Athens and Sparta, investigated the motives involved, and was painstakingly accurate. Thucydides's history was "scientific" as we today should use the term. He attributes orations to some of his characters, a device that such later historians as Livy were to follow. The most famous of these is the oration in Book II, in which Pericles tells what he thinks about the problems and ideas of the day. Thucydides was the master intellect, coolly scientific, whereas Herodotus had an eye for color and a curiosity for strange things that make him a delightful companion.

Though Xenophon (*d.* 355 B.C.) was not so deep a thinker as Thucydides, his works are extremely important to students of the history of Athens after 411 B.C., the date with which Thucydides's history closed. His style is fluent, and his works captivate the reader by their directness and rapid movement. The *Hellenica* continues Thucydides's account to 362 B.C. The *Anabasis* recounts the fascinating expedition of the 10,000 Greeks, of whom Xenophon himself was one, to help Cyrus the Younger wrest the Persian throne from his brother. The march of the 10,000 Greeks (400 B.C.) from Sardis came to a halt within a short distance of Babylon. Forced to retreat and moving up the Tigris, the Greeks fought their way through the rough country of Armenia. They finally arrived at Trapezus (Trabzon) on the Black Sea, whence they readily found their way home. Recounting one of the great stories of the world, this book has fittingly been the first classic for beginners in the study of Greek. The *Memorabilia* contains Xenophon's personal reflections about Socrates.

Oratory. The Greek city-state, as we have shown, was peculiarly the concern of its citizens, who were often called upon to express their

opinion in the assemblies, and for this reason oratory became a noble art. Even in Homer we note, particularly in the case of Ulysses, that persuasive speech was a prized accomplishment. When Athens became a great empire with momentous issues to decide, brilliant orators debated questions of state. Themistocles was the inspiring leader during the Greco-Persian Wars, but the greatest of all Athenian orators was Demosthenes (*d.* 322 B.C.). His orations, couched in the grand style, were always effective but became overwhelmingly powerful when he labored under strong moral conviction. His stirring speeches against Philip of Macedon have given us the word "philippic."

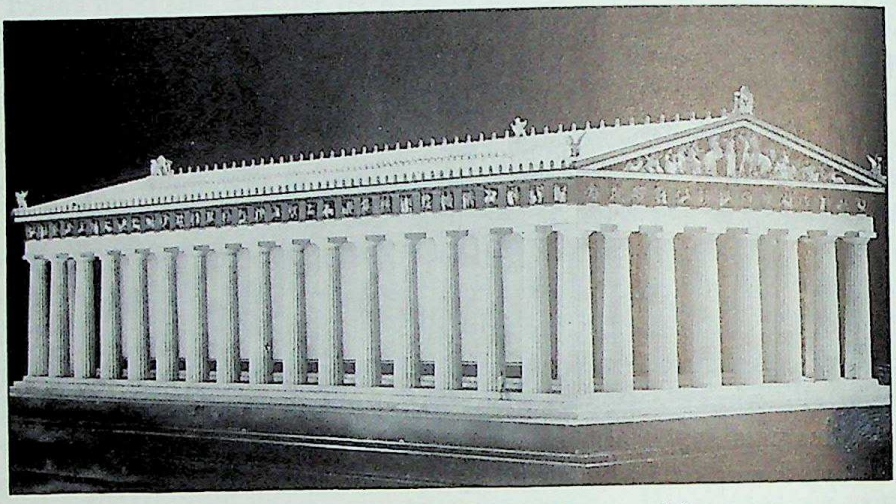


FIG. 23.—Parthenon at Athens, from model.

GREEK ARCHITECTURE. Greek architecture and sculpture find their highest expression in the temples, the civic and religious core of life in the city-states. They were the revered dwelling places of the protecting gods and goddesses such as Artemis of Ephesus and Athena of Athens. A keenly developed sense of civic religion caused the Greeks to make these abodes as perfect as was humanly possible until, by trial and error, they built temples of such perfect harmony, proportion, and repose as to capture the admiration of all mankind.

Yet the Greeks based their masterpieces on an essentially simple form, a rectangular box with a low-pitched gable roof, set on a low, stepped base. The core of the structure was a four-walled room called the *cella*, reserved for the statue of the local god and entered from the *pronaos*, or vestibule.

This simple style, enthusiastically adopted by the wealthy of today for their mausoleums, remained characteristic of the smaller temples. The severity of form was relieved by perfect proportions and the addition of sculptured decoration. Marble slabs covered the wooden trusses

of the roof, and under the eaves were added gracefully curved moldings and perhaps a frieze in low relief of a spritely festival or spirited hunting scene. In these earlier styles the original wooden roof construction was perpetuated in stone; that is, stone rafter ends called *triglyphs* were added, and these and the spaces between, called the *metopes*, were beautifully sculptured.

The larger temples had columns to support the roof, and the cella became an inner room hidden in a forest of marble shafts. But this, too, was a matter of development, and we find temples with columns across the front, front and back, and on all four sides, designs referred to as *prostyle*, *amphiprostyle*, and *peristylar*. The highest design and craftsmanship were lavished on the temple façade. The stately row of columns supported the architrave, or heavy crossbeam, a decorative band called the frieze, and the molded cornice. These three members, collectively called the *entablature*, afforded an opportunity for a great variety of artistic treatment. The triangle formed by the gable end of the roof, called the pediment, was an admirable space in which the sculptor could immortalize in marble his beloved gods and heroes.

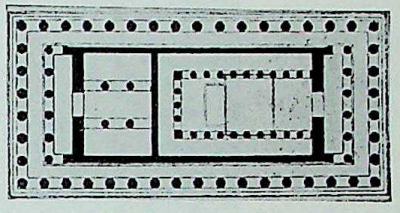


FIG. 24.—Parthenon at Athens: ground plan.

The various styles of temple architecture are roughly divided into three "orders" called the Doric, Ionic, and Corinthian, from their places of origin. They are easily identified by the form of column used. In the Doric, the oldest and simplest, the column is a plain, heavy shaft rising directly from the temple base and surmounted by a capital of a rounded band and square block called the abacus. The entablature above preserves the conventionalized metopes and triglyphs, but the entire treatment is restrained and severe. The Ionic, gaining favor at the close of the fifth century, is less heavy and more graceful. The columns are usually taller, fluted, and slenderer, and the capital more elaborate. The latter is composed of a pillow block carved in a double volute, a particularly graceful form. The entablature above is often broken by horizontal bands and molds; the frieze becomes a flat surface devoted to the low reliefs of the sculptor. The third order, the Corinthian, is an elaboration of the Ionic. The columns are taller and more fluted. The modified Ionic capital is almost smothered in sprays of acanthus, fern, or other leafy forms. It is an ornate style, which particularly delighted the artistically less sensitive Romans. In all the column designs the Greeks subtly curved the vertical lines in order to correct the optical illusion of a wasp waist given by perfectly straight lines. This principle,

called *entasis*, was used wherever the eye might imagine a sag—as, for example, in the long straight lines of the bases of temples.

The refinements and subtleties of Greek design have long delighted the world's builders, but none has surpassed the purity of design, the perfect proportion of the mass, the complete harmony of all parts achieved by the Greek temple architects. This challenge to human perfection has made Greek architecture the pride and despair of subsequent generations. An early nineteenth-century revival of the classical—a style of recurring favor through the centuries—has left us many quasi-Greek

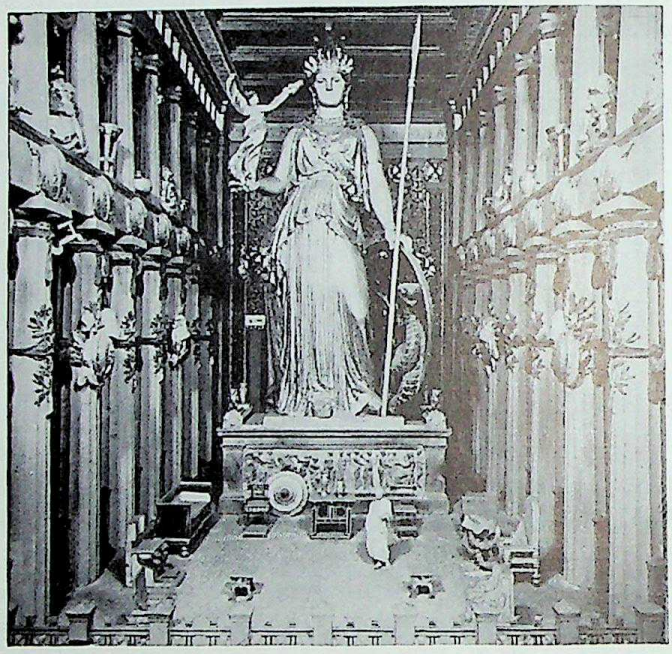


FIG. 25.—The Parthenon: interior with statue of Athena Parthenos.

temples masquerading as churches, banks, courthouses, and other public buildings.

SCULPTURE. Sculpture, the handmaiden of architecture, served to decorate the houses of the gods and glorify the story of their divinity and the prowess of the heroes who mingled with them. Sculpture, therefore, had a practical function and a definite place in the whole design, a fact we are apt to overlook when appraising isolated figures or fragments removed from their proper setting. But perfect craftsmanship was a matter of slowly won skill. Greek sculpture remained archaic in form and technique until after the Greco-Persian Wars. The characteristically stiff modeling, ill-fitting garments, and poor composition finally disappeared during the fifth century.

But perhaps we should glance briefly at the sculpture of the neighboring cultures the better to appreciate the tremendous advance made

by the Greeks. In Egypt, most of the tomb and temple decoration was painted on the walls, though there are some instances of walls carved in very low relief. But here, as in the painting, the figures are in profile, stiffly stylized with no sense of perspective, and typically archaic in form. Even in the free-standing statues of gods and rulers, the figures, with few exceptions, are heavy, graceless, and crude. Hittite and Syrian sculpture remained even more clumsy. Even in Assyria, where the temple and palace walls offered greater scope, sculpture remained a flat, uninspired stenciling. Only when the Assyrians, lovers of war and the chase, portrayed horses and lions did their enthusiasm overcome their stilted style. But at no time did they approach the high level of achievement set by the Greeks.

In studying Greek sculpture, we must remember two important facts. First, few originals have come down to us, the work of the greater masters being known only through inferior copies. Second, the Greeks painted marble statues in various colors, particularly red and blue. We do not know whether or not statues were completely painted, but certainly the impression we receive when looking at the cold figures of classical sculpture in the Vatican and other modern galleries is very different from that received by the Greeks. It is doubtful that they could have enjoyed these colorless marbles.

Myron of Athens was the first of the great Greek sculptors of the fifth century B.C. He is the creator of the bronze "Discobolus," or discus thrower, a youth about to throw the discus. One should compare the simple naturalness of this figure with examples from earlier sculpture. Polycletus of Argos, a successor of Myron, is noted for having worked out a system of proportions well illustrated in his bronze "Doryphorus," or spear bearer. The young athlete stands on his right foot, while his left foot, still resting on the toes, is about to be brought forward, all so naturally that he appears to be moving.

Much uncertainty exists about Phidias, the greatest Greek sculptor of the century. His statue of the maiden Athena, made of gold and ivory and placed in the cella of the Parthenon, is known only from poor copies. He also created the colossal statue of Zeus at Olympia, widely regarded as one of the great sights of the ancient world. Unfortunately, good copies of it too are lacking.

However, we can form some conception of the wonderful skill of Phidias from his work on the Parthenon. The two sets of sculptures in the pediments have been sadly mutilated, but important fragments still remain. The east pediment represented the birth of Athena, the protecting goddess of Athens; the west pediment portrayed the struggle of Athena with Poseidon for the possession of Attica. The frieze around the cella representing the Panathenaic festival, with over three hundred

figures, is about 522 feet long. The ninety-two metopes were adorned with scenes from the struggle of the Centaurs with the Lapithae and the Greeks with the Amazons.

Probably Phidias supervised the execution of some of these carvings, for no one man could do them alone; indeed, at many points the chisel of archaic stylists is still apparent. In spite of the fact that Phidias's assistants were not nearly so able as the master himself, this work represents the highest development of architectural sculpture in Greece. "For nobility, reserved dignity, perfect naturalness, chaste beauty,

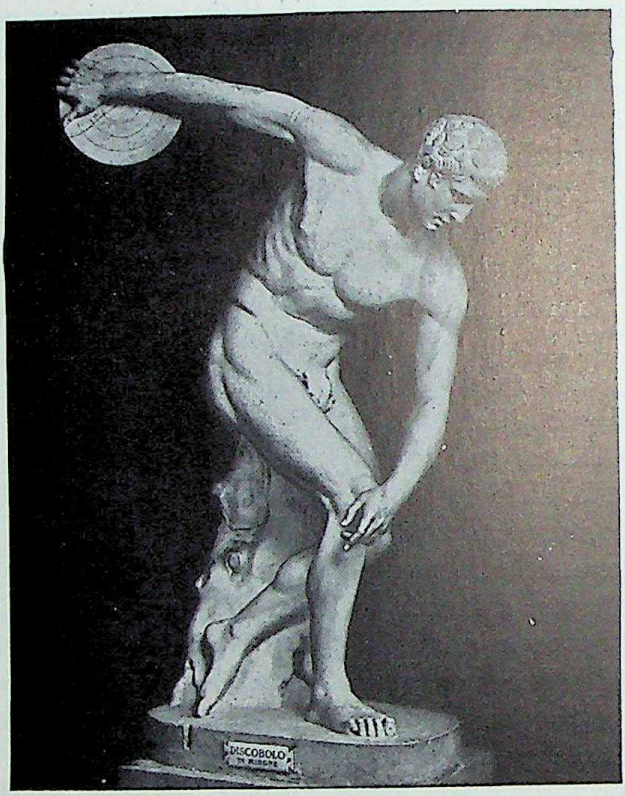


FIG. 26.—"Discobolus," by Myron.

sense of proportion, and mastery of the art of portraying action, repose, and the most delicate texture of flesh or drapery, the pediment sculptures, even in their ruins," according to Professor Trever, "are the wonder and despair of all ages."

The work of Scopas, another great sculptor, we know unfortunately only through copies. Like Michelangelo two thousand years later, he tried to make his individuals and groups express overwhelming emotion, especially the suffering they felt at a critical moment. The piercing glance of his figures gave rise to the phrase "Scopas eye."

Next to Phidias, Praxiteles was the greatest sculptor of Greece. His work is characterized by a refinement and delicacy that remind

us of the art of Leonardo da Vinci. Even the copies of his masterpieces reveal something of this artist's subtle skill. His "Hermes," unearthed at Olympia in 1877, is mutilated, but the head, trunk, and thighs are intact. The god smiles upon the babe Dionysus resting upon his left arm. The head, beautiful and refined, illustrates how Greek artists, after having attained the highest excellence in handling the human form and in arranging groups harmoniously, were led to impart an ideal human beauty to their creations. As we shall see, these tendencies produced noble results in the next century.

Some of the finest sculpture was done in connection with coins. As prosperity increased and every Greek city-state engaged in commerce, a variety of coins came into existence. The study of Greek coins reveals the remarkable individuality of the Greeks and the artistic rivalry between their cities. The coins are extraordinarily beautiful, those of Syracuse being most striking. The Greeks adorned their coins with naturalistic figures carved full and round so that they possessed corporeality, a feature lacking in modern coinage. Our banks are in the habit of stacking coins in columns. Thus, the surfaces must be flatter than the rims, and as a consequence the figures possess none of the thickness that they should have to appear real. Modern coins are insipid and meaningless compared with Greek coins, which are of an unrivaled beauty and are probably the most artistic the world has yet seen.

Painting. Little can be said about painting in ancient Greece, for time has been more unkind to it than to sculpture. Pictures were painted on vases of all sorts, and to them archaeologists owe much of their knowledge of Greek life. For the most part, however, these pictures are the work of practical craftsmen who were by no means great artists. The great painter Polygnotus worked in Athens after the Greco-Persian Wars, but we have no examples to give us even a hint of his excellence. He is reported as skillful in depicting elaborate scenes on temple walls. But his forms were flat, in profile, without any depth or sense of space, for artists had as yet little skill in mastering perspective. Apollonius of Athens tried to give objects the illusion of thickness by shading the colors. This apparently was the beginning of *chiaroscuro*, that is, the use of light and shadow in painting. By such steps the full excellence of Greek painting was attained. Zeuxis and Parrhasius, who worked during the Peloponnesian War (431–404 B.C.), enjoyed the highest reputation in antiquity. Although we have no examples of their work, we should not ignore them, for their art was the parent of subsequent figure painting.

Character of Pericles as Statesman. To Pericles (*d.* 429 B.C.), leader and statesman of Athens during her greatest magnificence, Greece owes more than can readily be told. Related to Cleisthenes, he was of

noble stock but became the leader of the common people, the masters of democratic Athens. Cool and calculating, he understood how to secure for Athens the leadership of the vast confederacy that had come into being after the Greco-Persian Wars. An effective speaker, he used his ability to bend the people to his will. More than any other statesman of the time, he typifies the leader of the most remarkable state of Greek antiquity. Educated by philosophers and trained in music, he took a deep interest in the intellectual progress of the time. He inspired the construction of the Parthenon and the adornment of the Acropolis and became the greatest patron of higher culture the Greek world had yet produced. Historians have fittingly called the period of his rule the "Periclean Age." This also was the age of Sophocles, Euripides, Phidias, and Thucydides as well as the period of the political and economic greatness of Athens.

Science and Philosophy. To the Greeks belongs the glory of having initiated intensive scientific and philosophical studies. Science is the accumulated and systematized knowledge of a given subject formulated to discover general truths or laws. When we say that the Greeks were the first people to develop true scientific study, we must bear in mind that collecting information is slow and difficult. The Greeks therefore could not develop all the sciences but in their chosen fields made invaluable contributions to all later civilizations.

How did the study of science begin? To this interesting question many answers have been given. For thousands of years, men had lived as simple food gatherers. All knowledge was so closely bound up with religious beliefs and practices that they could not study the phenomena of nature without reference to the gods who controlled such problems of life as birth, sustenance, and death. Men practiced magic, believing that through it they could control nature and solve their problems. Some scholars believe that science grew out of magic. It seems preferable, however, to seek for the beginnings of science not in the beliefs and practices of magicians but in the definite concrete knowledge men slowly acquired. They found out how to make fire by striking flints, catching sparks in tinder, and fanning them into a blaze. They learned how to hunt, fish, keep animals, raise crops, weave cloth, make pottery, and work metal. The moment men began to use precise knowledge in explaining the phenomena of nature, we have the beginnings of science.

We must not for a moment think that science as we know it existed from those first days. It was hard to get facts and even harder to know what facts to get. There were no instruments or laboratories; a beginning of all these things had to be made. The Greeks, as a rule, connected science with philosophy, and it is often impossible to tell whether the

first investigators of nature were scientists or philosophers. The philosopher studies all knowledge in order to find general truths about all things. This is very different from what the scientist does when he studies plants, for example, and discovers the principles of botany. The philosopher studies every aspect of things, plant as well as animal, organic as well as inorganic, in order to learn the principles underlying all. The result is not botany or zoology or geology, but philosophy.

Men wonder about the nature of things; all men are philosophers. We demand answers to the problems that are part of our very lives. All philosophy rises out of man's questioning about nature and his destiny. Though philosophy may be closely related to religion, the philosopher so far as possible bases his work chiefly on reason. The first Greek philosophers, like the scientists, shunned mythology, which they asserted was merely a poetical way of accounting for things, as, for example, Hesiod's *Theogony*.

Philosophic thought first began in Ionia (those parts of Asia Minor inhabited by Greeks) and on the islands near by. There was much business activity in these regions. Greek merchants traded with Egypt, Phoenicia, and Mesopotamia. We have described the *Histories* of Herodotus, a writer who gazed with wondering eyes upon the busy world of Ionia. We also have described the brilliant lyric poetry of Ionia, which expresses the bold individuality and intellectual independence of its people. But we cannot easily explain why reasoned thought developed here before it became noticeable in other parts.

The first Greek to trouble himself seriously with questions about existence was Thales (about 600 B.C.), a wealthy merchant and statesman who lived in Miletus. He had traveled to Egypt and other places, eager to learn all he could. He predicted eclipses and learned practical mathematics from the Egyptians. Impressed with the perpetual instability of the world about him, he probably was the first to give a nonmythological explanation of this constant change. He argued that water is the basic substance of which clouds, rock, soil, plants, and animals are but different forms. Water is continually transformed into other substances, which finally return to the condition of water. This is, of course, a most inadequate explanation; but it is the first attempt to give a purely reasoned account of very complex physical phenomena.

Anaximander believed that the "boundless," a kind of mist from which comes sky, earth, water, and air, is the primordial substance. In the perpetual process of change he held that the first men were born from fishes, an interesting but crude anticipation of the theory of evolution. Anaximenes, a younger contemporary of Anaximander and also from Miletus, agreed with Thales' thesis but taught that air, not water,

is the fundamental substance. These men form what is commonly called the Ionian, or Milesian, school of philosophy.

To Heraclitus of Ephesus (*d.* 475 B.C.) the basic thing in the universe was fire in its many forms. Fire changes into air, air into water, and water into earth. The reverse is also a fact: earth changes to water, water into air, and air into fire. The entire universe and all mankind are caught in this eternal ebb and flow. "Everything flows, and everything flees; nothing abides. In one river, the water which washes you is always different; you will not dip twice in the same water." Because all we see is constantly changing, it follows, he thought, that our senses, which give us changing impressions, cannot give us a truth that does not change. Fire is the highest unity in the universe; it is God and is in each of us; we must follow its inspiration if we want peace and understanding in this chaotic world.

Empedocles of Agrigentum in Sicily (*d.* about 430 B.C.) believed that there are four primal elements—earth, air, fire, and water—combinations of which form the world about us. Democritus of Abdera (*d.* 370 B.C.) thought that all things are chance combinations of invisible atoms constantly in motion. An "atomist," he failed to explain the personality of man, being unduly confident that his concept of atoms and their chance combinations was an all-sufficient explanation. But his theory did anticipate the atomic conceptions in modern physics and chemistry. Though inadequate, these bold speculations were of the utmost importance in the growth of science and philosophy.

Anaxagoras of Clazomenae (500–428 B.C.) likewise taught that all things are formed from atoms, or "seeds," as he called them, which have existed from all eternity. The combinations we see about us and of which we are parts are formed by a universal agent that he called *nous*, or mind; but he never explained what he thought this universal creating force really is. It is important to note that philosophers and scientists of Ionia believed the world to be composed of forms of some fine matter and hence were materialists but that Anaxagoras thought the creating force to be an intelligence somewhat like the human mind. This was to have vast consequences, as we shall see when studying Plato.

Pythagoras of Samos (*d.* 497 B.C.), who was deeply interested in mathematics, like Thales, also visited Egypt. He mastered much of the mathematical lore of Babylonia and Egypt and even improved upon it, for he gave a sound explanation of the theorem that in a right-angled triangle the square of the hypotenuse is equal to the sum of the squares of the sides. He developed theories of odd and even numbers and applied his knowledge of numbers to music. He noted that a tense harp string when shortened in fixed proportions produces fourth, fifth, and octave notes. In attempting to reduce knowledge of numbers to a

science, Pythagoras is responsible for many propositions later included by the geometer Euclid in his *Elements*.

The Pythagorean school flourished in southern Italy. One of its followers taught that the sun, moon, and planets revolve in orbits or hollow spheres around a great central fire. This was a remarkable scheme, for it anticipated later ideas about the rotation of the planets. The poetic idea of the music of the spheres goes back to the Pythagoreans. So important did the principle of number appear to the Pythagoreans that they explained the entire universe as a combination of numbers and geometrical figures. This may seem fantastic, but it is an advance upon the simple materialistic thought of the Ionian school.

The idea of the Ionian philosophers that all that is could be explained as modifications of basic particles like water, fire, or air did not satisfy everyone, however. Some thinkers could not agree that constant change is the main fact of the world. It appeared to them that the universe possesses some fixed aspects. The theory that all space is composed of minute atoms appeared untenable. Atoms are not separated; they are continuous, and so there can be no motion. What the Ionians described as motion really is an illusion of the senses. To such objectors, "being" was the only existent thing. These were the ideas of Xenophanes (*d.* 480 B.C.), who lived at Elea in Italy. The founder of the Eleatic school identified this "being" with "God the uncreated, unchangeable, and immovable." He criticized severely the polytheistic stories of Homer and Hesiod. His followers Parmenides and Zeno continued his pantheistic teaching that God is both all and one.

Scientific Medicine: Hippocrates. Scientific medicine, related to practical philosophy, first appeared among the Greeks. The Egyptians and other peoples closely combined religion with medicine. Disease was believed to be due to the displeasure of gods or to the presence of evil spirits. For this reason, it appears, some peoples in the Paleolithic and Neolithic ages trepanned skulls in order to let out evil spirits. The priests of Babylonia exorcised evil spirits. Disease was believed to have no natural cause; hence, rational medicine could not possibly develop. The beginning of Greek scientific medicine is ascribed to Hippocrates of Cos, who lived in the fifth century B.C. We know nothing about his personal life save that he was a member of a guild of healers founded according to tradition by the god Asclepius. A large number of writings ascribed to Hippocrates have come down to us, but some of them probably are the works of his followers. He avoided magic, studied clinically the course of disease, and made records of cases. Hippocrates and his followers knew something about anatomy and physiology, for example, the heart and the skeleton. In this respect, these men were "scientific."

Hippocrates taught that the body is composed of four cardinal "humors," or juices—blood, phlegm, yellow bile, and black bile. When these are out of balance, disease results. Proper diet restores their normal relationship. Rest, fresh air, and drugs were used. Other favorite devices were baths, massage, exercise, clysters, cupping, and bleeding. Abscesses were lanced and throat incisions made in cases of empyema. Bonesetting was common and undoubtedly well done, for fractures were numerous among an athletic people. Physicians were taught to be absolutely clean, a point that modern practitioners before Lord Lister (1827–1912), the father of antiseptic surgery, did not stress as they should have. Small wonder that Hippocrates is called the "Father of Medicine." The *Hippocratic oath*, taken by ancient physicians, is a noble one, enunciating a lofty ideal of professional medical ethics; it is still administered to students graduating from medical schools.

The New Education: Socrates and the Sophists. By the time Pericles began his career in Athens, many novel ideas were propounded about the nature of the world and its organization. These were so contradictory that men were not certain about any knowledge. The bulk of learning in mathematics, astronomy, physics, and medicine had increased to such a degree as to exercise a revolutionary effect upon ancient and established ways of thinking. Times were prosperous in democratic Athens, which enjoyed a lucrative trade with all parts of the Black and Mediterranean seas. Athenians took an active part in public debates and found it advantageous to reason well, speak persuasively, and know about the latest scientific and philosophical ideas.

A group of teachers called "Sophists" appeared, whose interest was, not primarily to advance scientific and philosophical investigation, but to teach the new knowledge for remuneration. Ability to talk and write effectively was a passion with them; for this reason, they developed rhetoric. The rules for writing they laid down helped to make the Greek language a subtle literary tool. Although clever reasoners, they indulged in trivial, flippant arguments and often resorted to questionable tricks to make a bad proposition seem good. They were skeptics, having no faith in the truth of any proposition. They denied accepted ideas, criticized the gods, and questioned morality. The world, they said, is formed of combinations of matter. These combinations change constantly, nothing is fixed, truth is illusory. The one thing of which man can be certain is his own thought and experience. Hence their famous statement that "man is the measure of all things." Such a doctrine, if applied, meant anarchy in science, ethics, and religion; but the first important Sophist, Protagoras of Abdera (*d.* 410 B.C.), taught these ideas with great success in Athens.

This uncertainty about moral questions was lamentable to Socrates's way of thinking. He was an Athenian, an ugly man with a noble soul. He refused to believe that such ideas as goodness, truth, right, and wrong were merely subjective notions and argued about them in the market place. His method was to induce someone to give a definition of, say, "truth." He would then proceed to show that the definition given did not exactly fit all that normally is involved in the idea of truth. A long dialogue ensued in which Socrates finally showed just what the notion "truth" consists in and that his definition was valid everywhere and at all times. Thus Socrates refuted the Sophists. His method of arguing, known as the "Socratic method," is famous; the reader may form a good idea of it by studying Plato's *Dialogues*.

Socrates never ceased his search for truth. But it was mistakenly thought that he disbelieved in the gods and corrupted the boys who listened to him. He was tried, adjudged guilty, and condemned to commit suicide by drinking hemlock. To Socrates, obedience was a virtue; he exemplified his high moral beliefs by obeying the commands of the state even in this great trial and died in 399 B.C. while chatting with his friends about the question of immortality.

Plato. Plato (*d.* 347 B.C.), the successor of Socrates, did not share Socrates's dislike of science, which the Sophists and their methods had so discredited, but studied it, even making geometry a preliminary study to philosophy. His ideas, recorded in the *Dialogues*, are expressed in Socrates's words. His *Apology* is Socrates's speech of defense before being condemned to death. The *Republic* discusses the ideal way of governing states. Plato believed that the "truths" which Socrates taught were valid at all times and in all places and for that reason were more than mere truths; they had a real existence apart from matter, men, and time. They belonged to a realm beyond man's mortal life, but man nevertheless had some limited experience of them. The "Idea of the Good" is the highest of these ideas. All others such as the "True" and the "Beautiful" are closely related to it. Matter is nonbeing. Being consists in the union of matter with Ideas. Only in union with the realm of Ideas do men realize their highest nature.

Plato taught a magnificent and ideal system, which has captivated man ever since. Christians, for example, often identified his Idea of the Good with God and nonbeing with evil.

Aristotle and His Works. Aristotle (384–322 B.C.), the greatest intellect of Greek antiquity, was equally distinguished as philosopher and scientist. He wrote a large number of books, but only a small number have survived. They cover every topic, science, art, ethics, and metaphysics, all these having been studied by the master himself or his predecessors. His works therefore constitute a veritable scientific and

philosophic encyclopedia. The *Organon* contains his works on logic, for the development of which he was largely responsible. His *Ethics*, *Politics*, *Constitution of Athens*, *Poetics*, and *Rhetoric* are books of basic importance. No other Greek thinker has exerted a more profound influence over so extended a period of time.

Aristotle's Theory of Being. Very different from his master Plato, Aristotle was coolly systematic and logical. Seeing the countless beings on every hand, that they were ever in change yet that ever in some way they did not change, he decided they moved, being in "potency," toward their full realization, their "act." So an acorn is an oak tree in potency. Such a doctrine was contrary to Democritus's teaching that only basic material atoms exist and that beings are little more than chance combinations of such atoms. Aristotle also rejected Plato's teaching that ideas are the sole existing beings. Each being, Aristotle held, is composed of "substance" and "accidents." A substance needs nothing but itself to exist in; the latter, as, for example, "quantity," "number," and "quality," can exist only with a substance.

Beings have four causes, as follows: (1) material cause; (2) formal cause, the idea according to which a being is made; (3) efficient cause, the agency bringing the being into existence; and (4) final cause, the end or final purpose because of which the being is created. These four causes operate in the elaboration of a being from potency to act. The study of essences (particular kinds of substance) abstracted from "matter" gives us "science." Aristotle taught that the Ideas which Plato thought had independent existence did not exist apart from mind.

Aristotle's psychology was of enduring importance. Knowledge consists in knowing "being." The five senses present different material particulars of a being (or object), the central "common sense" ties them together. With the assistance of the imagination and memory, a material image (or phantasm) is elaborated. Somehow, and this remains a mystery, by means of the "agent intellect" its nature or "form" is abstracted, and next the intellect expresses the derived "idea." Thus the intellect or immaterial thing grasps the material object and expresses it as an "idea."

Aristotle also taught certain scientific doctrines which long were accepted. The universe, formed of four elements—heavy matter, fire, water, and air—consists of a series of concentric spheres, the spherical earth in the center being motionless. Around it in circular orbits move the seven planets—moon, Mercury, Venus, sun, Mars, Jupiter, and Saturn. The universe is "geocentric," the earth occupying its central point. Other philosophers had taught that it was "heliocentric," but Aristotle unfortunately held to the geocentric theory. Above and beyond this system of planets stands the First Mover, or, as Christians

with deeper insight later would say, God, the eternal and supreme moving force, the highest Being, Himself uncreated.

Athens was now the artistic and intellectual glory of Greece. But although there had been much new building, most of the old town retained its narrow, crooked streets. The people had to depend upon wells fed by surface water, which were dangerous to health and perhaps one of the reasons for the devastating plague of 429 B.C. Pericles employed Hippodamus of Miletus to improve the ground plan of Peiraeus, the port of Athens. After the Greco-Persian Wars, Miletus had been rebuilt with parallel and cross streets at right angles like our American cities. But Athens never developed according to a systematic plan; it was impossible to change the streets of a city already centuries old. The houses of private citizens were small and mean; all in all, the city must have presented a dingy appearance.

The glories of Athens, however, attracted more attention than its squalor. Above the mass of houses rose the Acropolis, an oblong hill crowned with magnificent temples. Chief of these was the Parthenon, a Doric peristylar building 101 by 228 feet, having eight columns at each end and seventeen on each side. In the cella stood Phidias's maiden Athena. Constructed entirely of Pentelic marble by the architects Ictinus and Callicrates, the Parthenon was further adorned by Phidias's noble sculptures. The building, of great charm and perfection, draw the admiration of all who saw it. At the west end of the Acropolis stood the Propylaea, a gateway incorporating a broad flight of marble steps; at the top was a roofed structure through which people passed on their way to the temples. To the right was the Temple of Wingless Victory, a beautiful little structure faced with four Ionic columns. The Erechtheum, an irregular temple to the north of the Parthenon, had two parts, one a most beautiful example of Ionic architecture devoted to Athena, protector of the city, and the other sacred to Erechtheus, a legendary king of Athens. The latter has the famous Porch of the Maidens. In the open, beside the Propylaea, stood the colossal statute of protecting Athena visible far and wide from land and sea. Behind the Parthenon stood the Odeum, a place for musical festivals. On the south slope of the Acropolis lay the great theater of Dionysus, constructed of marble; to the north was the Theseum, a magnificient Doric temple.

In sheer originality no other people have ever equaled the astonishing resourcefulness exhibited by the Greeks during those centuries. Contributions of permanent significance to civilization had indeed been made by men of Paleolithic and Neolithic times, in Egypt, and in the Tigris-Euphrates Valley. These basic contributions embrace every aspect of hunting, agricultural, and seafaring life and include a long

list of achievements in crafts, building, and the domestication of animals, fruits, and grains. The social and political aspects of their life were of the utmost importance to the future, and upon them the Greeks erected their own social and political life. But the Greeks accomplished something exceedingly original—something former peoples at best only dimly apprehended. They were the first to break away from the traditionalism of ancient societies. They preferred to view things from the standpoint of logical reasoning. In this way were born the higher arts of civilization—philosophy, science, literature, art, and their practical applications. Greek creativeness, however, had not yet come to an end with the passing of Aristotle in 322 B.C. The following period, the Hellenistic, to which we now turn our attention, is in many ways one of the most remarkable in the history of civilization.

FOR FURTHER READING

BOSSERT, W. T., and W. ZSCHIETZSCHMANN: *Hellas and Rome* (for pictures)
BREASTED, J. H.: *Ancient Times*, Chaps. XIII–XIX
BURNET, JOHN: *Greek Philosophy*, Parts I and II
CAPPS, EDWARD: *From Homer to Theocritus*
COPLESTON, F. C.: *A History of Philosophy*, Vol. I.
CROISET, MAURICE: *Hellenic Civilization*
FREEMAN, K. J.: *Schools of Hellas*
GLOVER, T. R.: *Herodotus*
———: *The Ancient World*
GULICK, C. B.: *The Life of the Ancient Greeks*
HEIBERG, J. L., and D. C. MACGREGOR: *Mathematics and Physical Science in Classical Antiquity*
KIMBALL, S. F., and G. H. EDGELL: *History of Architecture*, Chap. IV
LAWRENCE, A. W.: *Classical Sculpture*
LIVINGSTON, R. W. (ed.): *The Legacy of Greece*
POLAND, FRANZ, E. REISINGER, and R. A. WAGNER: *The Culture of Ancient Greece and Rome*
REYMOND, ARNOLD: *Science in Greco-Roman Antiquity*
ROBIN, LEON: *Greek Thought and the Origins of the Scientific Spirit*
ROBINSON, C. E.: *Everyday Life in Ancient Greece*
SINGER: C. J.: *Greek Biology and Greek Medicine*
TARBELL, F. B.: *A History of Greek Art*
WALTERS, H. B.: *The Art of the Greeks*
WARBEKE, J. M.: *The Searching Mind of Greece*
WELLER, C. H.: *Athens and Its Monuments*

Chapter XI

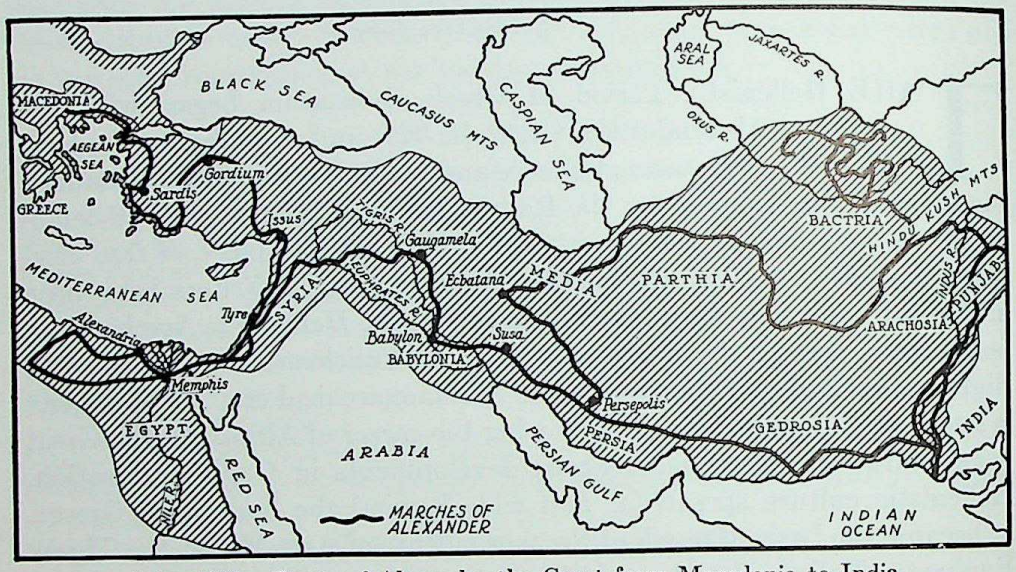
HELLENISTIC CIVILIZATION

Many the forms of life,
Wondrous and strange to see,
But nought than man appears
More wondrous and more strange.
—Sophocles, *Antigone*

THE Hellenistic Period of Greek civilization began with the career of Alexander the Great (*d.* 323) and extended to the time when the city-states of Greece and territories ruled by Alexander's successors were absorbed by the Roman Empire (146 B.C.). The democratic days of Greece had vanished forever. In the place of free city-states appeared the empire founded by Alexander. Writers have been in the habit of neglecting the civilization of the Hellenistic Age because, being interested in the democratic days of Periclean Athens, they had slight appreciation of the civilization of a monarchical era. This neglect is a mistake, for the centuries following the career of Alexander the Great were characterized by momentous developments in Greek civilization. Hellenistic culture spread far and wide beyond the borders of Greece. It became the basis of much of the new culture of Asia Minor, the Tigris-Euphrates Valley, Egypt, and the state of Rome rising in the western Mediterranean. For this reason the Hellenistic Age constitutes an important link in the history of Western civilization.

Alexander the Great and His Empire. A revolutionary change came over Greek city-states between 336 and 323 B.C., the few years that constitute the reign of Alexander the Great. Alexander succeeded to the throne of Macedon upon the murder of his father Philip. Already Macedon was a powerful state; it cast its political influence over Greek city-states to the south, whose jealousy of each other made them incapable of cooperating against a common enemy. Their quarrels and wasteful wars had so impoverished and weakened them that they were utterly unprepared to resist their powerful neighbor. Alexander induced the Greek city-states to accept him as their "leader." He had a fertile imagination, stimulated by reading the poems of Homer and the writings of great historians, particularly Herodotus. Believing that he was a descendant of Achilles, he thought that the blood of Homeric heroes coursed in his veins. He planned a campaign against Persia, the ancient

enemy of Greece, to avenge her invasion. Since the glorious successes at Marathon, Thermopylae, and Salamis, many Greeks had thought about the possibility of such an attack. The bold and vigorous proposal of Alexander fired their imagination. Setting out with a ludicrously small force of 35,000 men drawn from Macedon and the Greek city-states, this youth of but twenty years boldly invaded the Persian Empire, only pausing for inspiration at the site of ancient Troy, where Homer's heroes had fought. He won the battles of the Granicus, Issus, and Gaugamela, reduced Tyre and Sidon, and seized Egypt. The vast Persian Empire from the Aegean Sea to the Indus River fell into his hands.



Map XII.—Route of Alexander the Great from Macedonia to India.

Great Military Men and History. It is sometimes said that, compared with the discoveries of scientists and the labor of humble craftsmen, military deeds and military personalities are of minor importance. "Battle history" has been decried. Within reason, this view is a healthy reaction to the old-fashioned method of studying military and political history to the exclusion of cultural phenomena. But great military events and men nevertheless have profoundly changed the course of civilization. Battles and military events have a place in the history of culture, and this is especially true with respect to Alexander the Great, one of the world's unique personalities. He was only thirty-three when he died; yet he conquered Persia, revolutionized the Greek world, and exerted the greatest influence on the course of civilization. More change was effected by the achievements of his brief reign than many centuries of quiet evolution could have accomplished. Alexander introduced Greek ways of thinking and acting into the East, and Eastern

ways into the Greek West. This destroyed the distinction that Greeks for centuries had been making between themselves and the "barbarians."

THE HELLENISTIC MONARCHIES. Alexander's empire, stretching from the Nile and the Danube to the Indus, was the largest state yet brought together under one ruler. It embraced the civilizations of Egypt and the Tigris-Euphrates Valley, already hoary with age. It also included the Persian and Median states, which, although younger, possessed a venerable antiquity. These ancient civilizations offered little effective resistance to the new conquerors. Egyptians, Babylonians, and other peoples had been conquered repeatedly by foreign rulers; it was an old story to them.

Thus, when the Greeks came and energized their economic and political life and even their culture, these peoples accepted them without active or even passive opposition and with the utmost good grace adapted themselves to the new conditions of life. This explains why the Greek conquest of these lands made such permanent impressions. When Alexander died, his empire was divided among his generals, who founded a number of separate states such as Macedon, Egypt, Syria, and Pergamum. But Greek ideas, once introduced by the great conqueror, continued to flourish vigorously in spite of these political divisions, producing a hybrid Greek and Near Eastern civilization, which we call Hellenistic.

THE GREEK POLIS IN THE EAST. The chief means whereby Greek ideas and Greek ways were brought into the newly conquered territories was the institution of the polis, or city-state, which, as we have learned, was a basic feature of Greek life. Many new cities were founded, Alexander himself setting the example in spite of his imperialistic philosophy. Much wisdom was shown in choosing their sites. Many "Alexandrias," named after Alexander himself, were founded in India, Baluchistan, Afghanistan, and Turkestan. But the greatest of them all was Alexandria in the delta of Egypt, founded in 331 B.C. It soon became the greatest city of Egypt and a chief port of the Mediterranean. Antioch in Phoenicia also forged ahead of Tyre and Sidon. Others were Seleucia on the Euphrates, Seleucia on the Tigris, Berenice on the Red Sea, and Laodicea in Asia Minor. The population of such cities was largely composed of Greeks, attracted by opportunities for financial gain.

NEW EASTERN CONCEPTIONS OF GOVERNMENT. Methods and ideas of administration employed by the rulers of Hellenistic states derived largely from the older governments. In Egypt the rulers, descendants of Alexander's general Ptolemy, followed the methods of the ancient Pharaohs but regulated life with far more thoroughness in order to extract the greatest profit. The rural population was composed of serfs; the cultivable land was divided into estates owned for the most

part by the Ptolemies. The rulers of the Seleucid Empire, founded by Alexander's general Seleucus and embracing most of the conquests in Asia, continued the methods of government that had been developed by the Persians. The old state lands were tilled for the ruler by the serfs. In Macedon and even in Greece, large estates gradually came into being and the people sank back into serfdom. Hellenistic society rested on the labor of serfs, men half free and half bond. This principle of the large estate tilled by serfs ultimately became the social and economic basis of early medieval civilization.

One striking feature of the Hellenistic states was the belief that the ruler was a god. This idea, throughout the Near East, was common: in Egypt the Pharaoh was a god, in Babylonia the ruler was the spokesman of the gods. The Persian ruler was the special earthly representative of Ahura Mazda and his assistant in the perpetual struggle with the hosts of evil led by Ahriman.

The idea of a god-king was entirely foreign to the Greeks. In their city-state life, they had been in the habit of elevating fellow human beings, not the gods, to the highest political positions. In Athens every citizen at some time or other was required to shoulder the responsibilities of office. At all times he had something to do with the ecclesia, the popular representative body. So long as Alexander was merely king of Macedon, the idea of a god-king did not occur to him; but when he was confronted with the practical problem of ruling Near Eastern peoples, the conception became important. When in Egypt, he made a mysterious visit to the oasis of Siwa, as it is called today, to worship at the shrine of the Egyptian god Amen. We do not know much about what happened at the temple, but it was rumored that Alexander had been hailed by the priests as son of Amen. The Ptolemies, who ruled in Egypt after him, were regarded as divine, like the ancient Pharaohs, by the Egyptian population. The Seleucid monarchs also were held to be divine by their non-Greek subjects.

But the philosophic Greek, always rational, could not easily bring himself to share this belief, to view his ruler as Near Eastern peoples regarded him. Later, the idea of the god-ruler did gain strength among the Greeks of the West. Thus the practice of having divine rulers came from the Near East, brought to the West by Alexander the Great and his successors. This principle had important consequences in Roman times, for it helped to establish absolute government and hold together the far-flung empire.

Economic Conditions. Great prosperity resulted from Alexander's conquests. Royal roads and other routes of communication became busy channels of economic activity. The Indus Valley, Turkestan, Afghanistan, Persia, the Fertile Crescent, Egypt, Asia Minor, and lands around

the Aegean were brought into close economic intercourse; and the energetic, resourceful, and adaptable Greeks made ample use of the new economic opportunities, aided by the vast hoard of 180,000 gold talents piled up by the Persian kings and released by Alexander. The gold content of a talent was over a thousand dollars of American money, and its purchasing value was even greater. Alexander also distributed large sums to pay the debts of generals and soldiers and contributed to the restoration of many temples in Greece. Expenditure of such fabulous sums stimulated economic life; but eventually the treasury had to be replenished by taxes, and Alexander's successors became notorious for the vast sums they extorted. The Ptolemies, for example, had an annual income amounting to as much as sixteen million dollars in American money.

Agriculture, Industry and Trade. Reviving economic conditions necessarily stimulated agriculture. The horse breeders of Persia found new markets, farming in the Tigris-Euphrates Valley improved, Syria bloomed like a garden, and trade in grain and livestock constantly increased. Industry flourished; the weaving of textiles, mining of gold, silver, and copper, and manufacture of perfumes and other articles of luxury boomed. Trade expanded steadily, to the great advantage of the many new urban foundations. Travel became secure, the volume of coined money increased, and sea-borne trade became so important that regular sailing schedules were maintained even during winter months.

Culture in the Hellenistic Cities. Hellenistic cities were built in splendid fashion. Plans were geometrical like a checkerboard, as in many American cities. Usually a wide street, crossed by others at right angles, ran through the center. The great increase in wealth made it possible to adorn cities with costly temples, theaters, colonnades, market places, baths, libraries, and statues. They were provided with water systems, Alexandria being fed by pipes laid underground, Pergamum by pressure aqueducts, and Priene by a system of filter beds. Often the main streets were paved. Walls with gates and towers at suitable intervals were built around the cities for their protection.

As Greeks everywhere enjoyed a monopoly of trade and industry, a common Hellenistic civilization sprang up and the Attic dialect rapidly became the commercial language. Known as the *Koine*, or common dialect, it was used by non-Greeks, as well as by Greeks, for intellectual and commercial intercourse. Most of the literature of the period was written in it, and it became the universal medium in the eastern Mediterranean, like English or French in Europe and Asia today. Even the Jew of Alexandria adopted this Hellenistic Greek, translating the Old Testament into it. This translation, called the Septuagint, was widely

used. So common did the Koine become that the New Testament was also written in it, and St. Paul used it exclusively on his missionary journeys.

Intellectual activities were more widespread than ever before, many new cities suddenly acquiring fame as centers of learning. Athens long maintained a certain leadership in spite of her decline. The Academy and the Lyceum, where the followers of Plato and Aristotle continued their studies, became famous philosophic fraternities. There was also a lively book trade in Athens, where official texts of the tragic poets were kept. But minor places like Sicyon and Megara continued to furnish their quota of learned men; and, in Sicily, Syracuse became quite famous.

Among the newly founded centers, Alexandria, capital of the Ptolemaic government of Egypt, stood preeminent. Near the royal palace rose the Museum, an institution modeled after the Academy and the Lyceum of Athens but dedicated to study and research rather than to philosophy. It resembled a modern university, whose function is to encourage study, writing, and teaching. Supported by the Ptolemies, it gave free board to scholars who came to live at the Alexandrian court. There were lounging rooms and colonnades for the scholars.

The Museum had a large library, with as many as 700,000 books, each one probably about as long as four chapters in this volume. This was the accepted length for classical books; written as they were on rolls of papyrus, any greater length would have made them unwieldy. Practically the entire bulk of Greek writing was kept here, and strenuous efforts were made to preserve perfect texts. Mathematics, mechanics, geography, science, and medicine were the most popular subjects. Grammar and philology also became important. But scholarship was encyclopedic; men were interested in making summaries of knowledge, collecting, sifting, and arranging the learning of former scholars rather than striving for original contributions.

Revolution in Religious and Political Thought. Far-reaching changes appeared in ways of thinking, for several reasons. First, the simple and to us naïve beliefs in the innumerable gods described by Homer and Hesiod was undermined by the rapid growth of science and philosophy during the sixth and fifth centuries B.C. Philosophers, criticizing and even ridiculing popular beliefs, introduced many contradictory teachings. The heroic Socrates taught the truth of concepts, Plato eloquently proclaimed the independent existence of Ideas, and Aristotle's philosophy established the good purpose or end for which each thing had been formed. But the question "What is truth?" persisted.

Second, Alexander the Great had revolutionized the city-state, disrupting old ideas about politics, society, and economics, as well as religion. Political life seemed meaningless when Greek religion and

patriotism died with the polis. The economic and social conceptions of democratic times seemed out of date. The thinking Greek of the third century B.C. was confronted with vast political and social changes; state, society, business, and religion appeared bankrupt. Life without purpose was stale and flat; it threatened to become unbearable as certainty of purpose vanished.

STOICISM. Stoicism appeared to be the chief answer to the problems mentioned above. Founded by Zeno (*d.* 258 B.C.), a Semite from Cyprus, the new philosophy was enthusiastically received in Athens, where he taught. He placed "virtue" above all things, even above the search for the physical secrets of the universe. Virtue was practical; it would give comfort in the rapidly changing conditions of Hellenistic life. Zeno's reasoning was simple; he believed that the material universe exhibits a perpetual ebb and flow, "fire" being the origin and end of all things. Perhaps he derived his doctrine from Heraclitus.

A pantheist, Zeno identified the universe with God and taught that the ways of "divine nature" are the very ways of God. All our ideas come through the senses; our notions, therefore, rest upon nature itself. Further, our souls are material; they are sparks of the "divine nature." As they return to this divine nature upon death, there is no individual immortality. The highest good is virtue, which consists in arranging one's life in harmony with the laws of divine nature or of the universe. Herein lies happiness. Houses, clothing, food, wealth, pleasure, and pain are to be subordinated to virtuous action, and the wise man is indifferent to such things. He stands above family, business, and polis; he is a citizen of the wide world, for is he not a child of God and brother to all men? All men are equal; there is no real difference between Greek and barbarian. Was not this idea plainly brought out by the conquests of Alexander, which removed the barriers between the two?

The Stoics gained many adherents, but their philosophy never became popular among the masses. It could give no answer to such central problems of life as war, hunger, pain, disease, and death. To the lower classes, who suffered much, this severe philosophy made little appeal. Stoicism viewed the gods with indifference. It even undermined the religion of the people, for it did not solve the problem of certainty for them.

On the other hand, we cannot deny the moral elevation of Stoicism, and its teachings and practice produced many noble Stoics. We have only to think of Seneca, Epictetus, and the Roman emperor Marcus Aurelius. The conviction that all men are equal and that there is a "natural law" governing all things contributed much to modern democratic ideas, which presuppose the equality of men. The Declaration of Independence is a distant echo of this teaching.

Epicureanism and Its Effects. Epicureanism, the teaching of Epicurus (*d.* 270 B.C.), endeavored to satisfy the questioner by its doctrine of pleasure. Epicurus thought that the universe is composed only of minute atoms, as Democritus had taught, and that all things in it are but combinations of such atoms. Such combinations are formed by "chance" and not by design, the will of the gods, or the mind of man. Epicurean teaching was pure materialism. The gods as depicted in the epic poems were to be ignored and forgotten. To be at peace in this world, one should seek "pleasure." One should not trouble one's head about such questions as disease, death, and the quota of human ills. Vice, too, is to be avoided, for it brings pain, which precludes pleasure. This pleasure is not exactly hedonistic, but merely avoidance of pain or discomfort. Epicureanism had few followers; yet its doctrines had such champions as the Roman Lucretius (*d.* 51 B.C.), who wrote *On the Nature of Things*.

Progress in Medicine. In medicine we have noted the great work of Hippocrates and the Hippocratic school. Although practitioners were essentially handicraftsmen, they often made use of special knowledge and devices. During the next few centuries, great progress in medical art was made, and it soon became a definite science. For example, Diocles of Carystus, who worked in Athens during the fourth century B.C., made a special study of anatomy and wrote perhaps the first book on the subject. He also wrote on plants, which he studied with a view to their pharmacological value. Finally, he elaborated a system of hygienic living in which exercise, moderate diet, siestas, bathing, and massage had a regular place. Herophilus of Chalcedon, a teacher and physician in Alexandria about 300 B.C., improved anatomy. He dissected the bodies of animals and human beings and described well the eye, genital organs, and membranes of the brain. He also knew something of the function of nerves. His studies of the pulse offered some correct information, although he was not able to free himself from some erroneous notions. He believed, for example, that there is a connection between the action of the pulse and rhythm in music. His knowledge of anatomy was important in midwifery, the practice of which he greatly influenced.

The next medical teacher in Alexandria was Erasistratus, also an anatomist. He studied the epiglottis, the heart and its valves, the liver and bile ducts, and the nerves. It was in pathology, however, that he departed most from his predecessors. He abandoned the old dogma of the four humors and the theory that illness is caused by a lack of balance among them. He taught that disease, though produced by natural causes, is local, being due to an enlargement of blood vessels because of an excess of nutritive substances. If such a "plethora"

occurs in the lungs, the result is pneumonia; if in other places, epilepsy, disease of the stomach, and so forth. Abandoning the dogma of the four humors was important for scientific progress; unfortunately, later physicians disregarded his theories and continued to practice medicine on the basis of humoral pathology.

Botany: Theophrastus. Aristotle's pupils in the Lyceum continued the work of their master, especially in science, but for the most part limited their work to a special branch. Theophrastus (*d.* 287 B.C.) studied plants, becoming the first great botanist. We often forget how difficult it is to develop a new science. Not only is it necessary to make scientific observations, but much preliminary work is required to search out examples and develop a collection of exact terms. Theophrastus produced a botanical vocabulary to describe the 600 plants he studied, to keep physicians eager to discover new medicines. He took pains to learn all about the problem of germination and knew that plants were distributed on the basis of climate and soil. This was a fine beginning; but unfortunately there were no more original investigators in biology, and so the noble example of Aristotle and his pupil produced no further results until Dioscorides Pedanius in the first century A.D.

Mathematics and Mechanics: Euclid. The greatest progress made in Hellenistic times was in mathematics and its related science of mechanics. We have noted that from the time of Thales there had been much enthusiasm for mathematical study. Plato was especially interested in it and made it the basic study for his Academy. Propositions relating to geometry were collected and arranged by Euclid, who lived in Alexandria about 300 B.C. His *Elements*, thirteen books in all, embraces the usual propositions relating to plane and solid geometry and has been used by Greek, Roman, Jewish, Arabic, and modern scholars. Until recently, boys and girls learned their geometry from Euclid's *Elements*, but today its place has been usurped by modernized texts.

Euclid followed a regular procedure in demonstrating a proposition, as follows: hypothesis, illustration by means of a diagram, the chain of reasoning leading from the known to the unknown, and finally the point "which was to be demonstrated." There is something peculiarly Greek in the orderly precision with which Euclid's reasoning progresses. Nothing like it had appeared in former ages. Another mathematician, Apollonius Pergaeus (of Perga) (*d.* 200 B.C.) developed conic sections, a more advanced division of geometry dealing with the ellipse, parabola, and hyperbola.

Archimedes and Others. Of scientific geniuses among the Greeks none equaled Archimedes of Syracuse, who died in 212 B.C. Not much is known about his early life, but it is certain that he studied in Alexan-

dria. He was responsible for many solutions in conic sections, being especially proud of the ones that determined the relationship between the areas of the surfaces and the volumes of a sphere inscribed in an equilateral cone and of a cylinder circumscribing a sphere, probably the highest achievement of Greek mathematicians. But Archimedes won his greatest fame in mechanics. He demonstrated the laws governing the action of the lever, one of the basic propositions in mechanics, and discovered that a solid body immersed in a liquid becomes lighter in proportion to the weight it displaces in the liquid. This well-known "Archimedean principle" is of basic importance in hydrostatics, the science of the pressure and equilibrium of incompressible liquids. Archi-

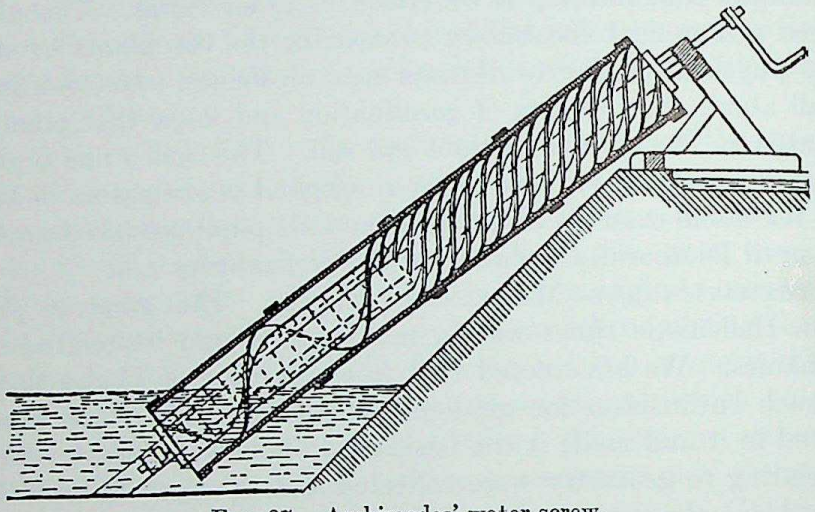


FIG. 27.—Archimedes' water screw.

medes' screw, a useful device to raise water out of ship holds, consists of a broad-threaded screw placed in a hollow cylinder open at both ends. When inserted slantwise in water and rotated, it serves as a pump. In modern times, this screw became the basic part of the steam turbine. Archimedes also developed the laws governing pulleys and understood the laws of lenses, which properly belongs to the study of optics.

There were other mechanical geniuses in the Hellenistic Age, particularly Ctesibius of Alexandria, a contemporary of Archimedes. He invented a water organ, a taximeter, a slot machine, and a steam engine consisting of crooked pipes through which steam was forced, thus causing them to revolve much as water forces a lawn sprinkler to rotate. But classical antiquity never proceeded very far with mechanical invention, probably because in view of the abundance of cheap slave and serf labor mechanical labor was not needed. The practical application of all this theoretical knowledge never seems to have occurred to the intellects who developed it. They considered their inventions interesting as

playthings, with little practical value save in such cases as the pulleys and Archimedes' screw.

STUDY OF GEOGRAPHY: PYTHEAS. Geographical knowledge increased greatly. The Greeks had become acquainted with every nook of the Mediterranean world during the long period of colonization and trade. Many a Greek felt the keenest delight in exploring these unknown waters and the lands touching them, even though no curious Herodotus has left us a record of his impressions. About the time of Alexander's campaigns in Persia, Pytheas of Massilia, or Marseille, ventured beyond the Strait

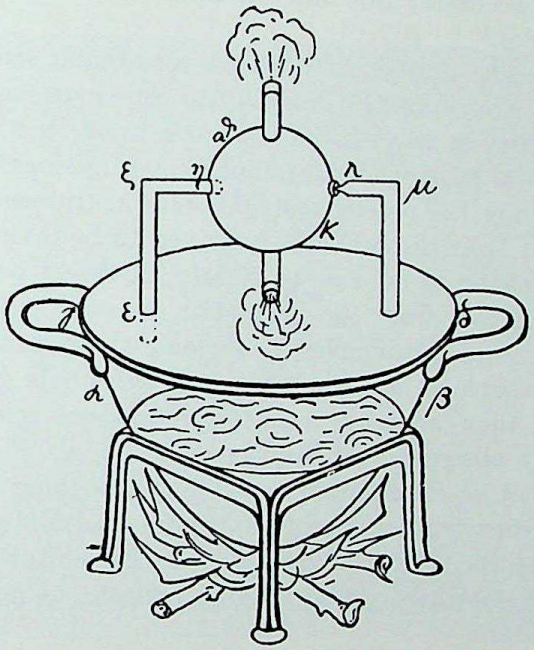


FIG. 28.—Steam engine of Hero of Alexandria.

of Gibraltar and explored the British Isles. His stories were so different from preconceived notions that he was regarded as a romancer. Alexander's visit to India greatly increased Western knowledge of those parts; and Ptolemy, the ruler of Egypt, tried to open trade contacts. Voyages were made, taking advantage of the monsoon, or periodic wind in the Indian Ocean. Some geographers even believed that one could sail around Africa from the Strait of Gibralter to the Indian Ocean, but this theory was never demonstrated practically until Vasco da Gama in 1497–1498 sailed from Lisbon to Calicut.

These advances in geographical knowledge were made by practical men; but there also was noteworthy theoretical progress. In this respect, Greek mathematical science was of basic importance. Lines of latitude and longitude were projected, imperfectly of course, but

constituting nevertheless a distinct scientific advance. A follower of Aristotle named Dicaearchus made a map of the world about 300 B.C. in which he tried to show proportions scientifically and also the height of mountains. But the highest honors in scientific calculation belong to Eratosthenes of Cyrene, the librarian of Alexandria (*d.* about 200 B.C.). He learned that when the sun at midday shone directly into a deep well at Syene in Egypt its shadow at Alexandria formed an angle of 7°12′. The exact distance between the two places was known, and it was therefore easy to calculate the earth's mean circumference. The result was amazingly accurate; the miscalculation amounted to only about two hundred miles.[1]

Limits of Greek Science. With the remarkable scientific achievements described above the Greek ability to cope with nature practically reached its maximum success. To achieve more, a wider knowledge of nature and more prolonged and minuter investigations were necessary. But for such study the precise and elaborate instruments that modern scholars have at their disposal still remained to be invented. For this lack the Greeks were in no wise to blame. A defect peculiar to much of Greek science rose from the inclination to study observed facts in the light of philosophic principles, to see only those things which had a place in a philosophical system, preventing scientists from appraising phenomena as they actually were. The modern scientific searcher knows that any observed fact may have meaning. He cannot afford to ignore any bit of information concerning the thing he is studying. Nevertheless, when we consider what Egypt and Babylonia achieved and what Paleolithic, Neolithic, and Bronze Age cultures were like, we understand why Greek scientific striving brought to man's thinking a veritable revolution.

Comedy: Menander. Literature also changed during Hellenistic times. Epic poetry vanished because the age of heroes now lay far in the past; only the scholars of Alexandria wrote epics, perfect in form but empty of meaning. Lyric poetry no longer flourished. Tragedy also had come to an end; it had been too closely associated with the life of the free polis.

But comedy made progress. Menander wrote in Athens about 325 B.C., and such was his influence on subsequent playwriting that he became one of the chief founders of the modern drama. What he accomplished may be seen in the plays of Plautus and Terence, Roman comic poets who tried to imitate him. His plays were long lost, but recently archaeologists have found many fragments of them in Egypt. Menander drew his scenes from contemporary city life, depending upon amusing

[1] For a diagram illustrating Eratosthenes's calculation, see Max Cary, *A History of the Greek World from 323 to 146 B.C.*, pp. 407–408.

incidents concerning ambitious slaves who tyrannized over their masters, mistaken identities, foundlings, and so forth.

Pastoral Poetry. Pastoral poetry was a natural expression of the Hellenistic Age. Its chief master was Theocritus of Syracuse, who wrote in the third century B.C. Menander loved the life of the Hellenistic city; Theocritus wrote for those who were bored with it. Pastoral, or bucolic, poetry described rural life as the city man thought he saw it. Never having milked sheep, tended goats, or tilled the ground, Theocritus idealized the life and loves of simple folk. He wrote very little; but that little was exquisite, though somewhat artificial, and was imitated by

Fig. 29.—Altar of Zeus at Pergamum. (*Courtesy of the Pergamum Museum,* Berlin.)

many. His second idyl presents Simaetha, a rural maid madly in love with Delphis, who has jilted her. She appeals to magic, asking Hecate and Selene to help her. With her maid Thestylis, she appears in a moonlit garden near the sea and pours out the story of her love and her vows of vengeance.

Where are my laurel leaves? Come, bring them, Thestylis; and where are the love charms? Wreathe the bowl with bright-red wool, that I may knit the witch knots against my grievous lover, who for twelve days, oh cruel, has never come hither, nor knows whether I am alive or dead, nor has once knocked at my door, unkind that he is! Hath love flown off with his light desires by some other path—love and Aphrodite? Tomorrow I will go to the wrestling school of Timagetus, to see my love and to reproach him with all the wrong he is doing me. But now I will bewitch him with my enchantments! Do thou, Selene,

shine clear and fair, for softly, goddess, to thee will I sing, and to Hecate of hell. The very whelps shiver before her as she fares through black blood and across the barrows of the dead. Hail, awful Hecate! to the end be thou of our company, and make this medicine of mine no weaker than the spells of Circe, or of Medea, or of Perimede of the golden hair. My magic wheel, draw home to me the man I love!

History. Polybius of Megalopolis was the last important historian produced by Greece. He lived during the second century B.C., when Macedon and Greece fell under the rule of Rome. His work, the *Histories*, dealt with the Roman conquest, tracing the story from the great struggle with Carthage to the fall of Corinth in 146 B.C. Unfortunately a large part of his work has been lost. His style is plain and somewhat heavy; it lacks the polish that characterized Alexandrian writers. Polybius did not like the breezy tales of Herodotus or the speeches of Thucydides. He projected an outline and followed it consistently, trying to determine the deeper causes of events. His historical vision was broader than that of previous Greek writers.

Hellenistic Sculpture. Hellenistic sculpture and painting were graced by some great names. Lysippus of Sicyon continued the tradition set by Phidias and Scopas. He was noted for strenuous realism and great vigor, as well as for his ability to express character. His "Apoxyomenos" is a statue of a youth scraping the sand and oil from his body after wrestling. The form of the young man is slender and lithe; the head is small and intelligent. It has little of the idealized beauty that characterizes the "Hermes" of Praxiteles. As Lysippus worked in bronze and was official sculptor to Alexander the Great, we may assume that many of the anonymous portraits of this hero were derived from originals by him.

A new artistic era now appeared. Following in the footsteps of Lysippus, artists attained the fullest mastery over materials, and the greatest virtuosity was displayed. Every trace of archaic conceptions vanished, movement was unhampered, and vigorous action became popular. Four stone coffins from the underground caverns at Sidon, discovered in 1887 and now in the museum at Constantinople, belong to this period. One of them, the Alexander sarcophagus, bears a battle scene in high relief, such vigorous contests being popular themes at this time. Later artists exaggerated movement, and their productions tended to become pompous, restless, and theatrical.

There still exist sculptures representing the artistic achievement of Pergamum in western Asia Minor. The "Dying Gaul" and the "Gaul Slaying His Wife and Himself" are two of its noteworthy productions. The Gauls, or Celts, had begun to invade Greece and Asia Minor in 279 and 278 B.C. but were defeated in 241 B.C. by King Attalus I of

Pergamum. A large number of statues were set up to commemorate this victory over the barbarians from the north. The "Dying Gaul" is a fine piece of realism, the dense crop of matted hair, the stubby moustache, and the gold collar being rendered in great detail and the

FIG. 30.—"Death of Laocoön and Sons." (*Courtesy of the Metropolitan Museum of Art.*)

agony of death portrayed most effectively. The "Gaul Slaying His Wife and Himself" shows a barbarian Celt who, to avoid slavery, has just killed his wife and is thrusting his sword into his own breast.

The Pergamene school is best understood through the magnificent remains of a temple in Pergamum excavated between 1878 and 1886

and now set up in the museum in Berlin. A platform 100 feet square erected for the altar of Zeus was decorated with sculptures in high relief illustrating the old theme of the battle between gods and giants. The figures are over seven feet in height, and the energy displayed by their writhing forms reminds one of Michelangelo's vigorous creations. Although

FIG. 31.—"Aged Market Woman." (*Courtesy of the Metropolitan Museum of Art.*)

FIG. 32.—"Venus of Milo." (*Courtesy of the French Information Center, Inc.*)

they exhibit marvelous skill and are among the most imposing examples of Greek sculpture that have come down to us, they are too restless to satisfy our artistic sense completely.

The characteristics of the art of Pergamum were adopted by the school at Rhodes, a flourishing port in Hellenistic times. As the commercial emporium of the Aegean, it enjoyed continuous relations with

Black Sea ports. Its inhabitants erected at the entrance to the harbor a gigantic statue of their favorite god Helios. This statue, called the "Colossus of Rhodes," was famous in antiquity as one of the wonders of the world. The great art of Rhodes, however, is best known through the "Laocoön." This famous group portrays the priest Laocoön and his two sons being crushed by two huge serpents, from an incident described by Homer. It is characterized by excessive emotion and some meaningless detail; the serpents are not large enough to crush the father and his sons, nor is the size of the youths in proportion to that of their father. This work, which belongs to the middle of the second century B.C., marks the last stage of creative energy in Greek sculpture.

In spite of the artistic decline of Greece, many admirable pieces were still produced. Among these is the Portland vase. It is made of two layers of glass, white over dark blue. The top layer was ground away by hand, leaving a beautiful white cameo design on the blue background. This striking combination has been copied extensively by the English artists who produced Wedgwood ware. Equally famous are the "Boy and Goose," the "Victory (Nike) of Samothrace," the "Venus of Milo," the realistic figure of the "Old Market Woman," the "Farnese Bull," and the "Apollo Belvedere."

Hellenistic Architecture. The vigorous energy of the Hellenistic Age profoundly influenced architecture. Extensive building activity made possible a steady evolution of the forms of the fifth century. The Doric order disappeared, being supplanted by the Ionic. The columns became more slender and graceful. The Corinthian order also grew in favor; its elaborately foliated capital satisfied the growing desire for display. Architects began to use the true arch, that is, the arch which depends upon a keystone, of which the full significance and application were not appreciated, however, until Roman architects developed its use. The Greek manner of building private dwellings now spread to all parts of the Hellenistic world, being well adapted to warm climates. The central feature was a court surrounded by rooms opening upon it. This court, open to the sky and surrounded by a colonnaded porch for shade from too glaring sun, was the center of family life and proved so popular that its counterparts dot the hills and valleys of Asia Minor today.

Closing the final period of Greek creative originality, the Hellenistic Age concluded an epoch in the history of civilization. It appeared that its contributive force had become exhausted. After Archimedes, few really significant scientific discoveries were made. But Greek civilization, hitherto confined to the narrow geographical limits of city-states, overleaped its barriers and spread to all parts of the then known world. The conquests of Alexander the Great were the practical means whereby this was accomplished. Egyptians, Babylonians, Assyrians, Persians,

and the people of Asia Minor succumbed to the influence of Greece, and intellectual life received a stimulus more powerful than ever. India, China, and the nomadic Sarmatians of the steppes north of the Black Sea felt the charm of Greek conceptions, especially naturalism in art. But nowhere was the force of Hellenistic civilization more powerful than in the Roman Republic, at that moment rapidly forging to the front.

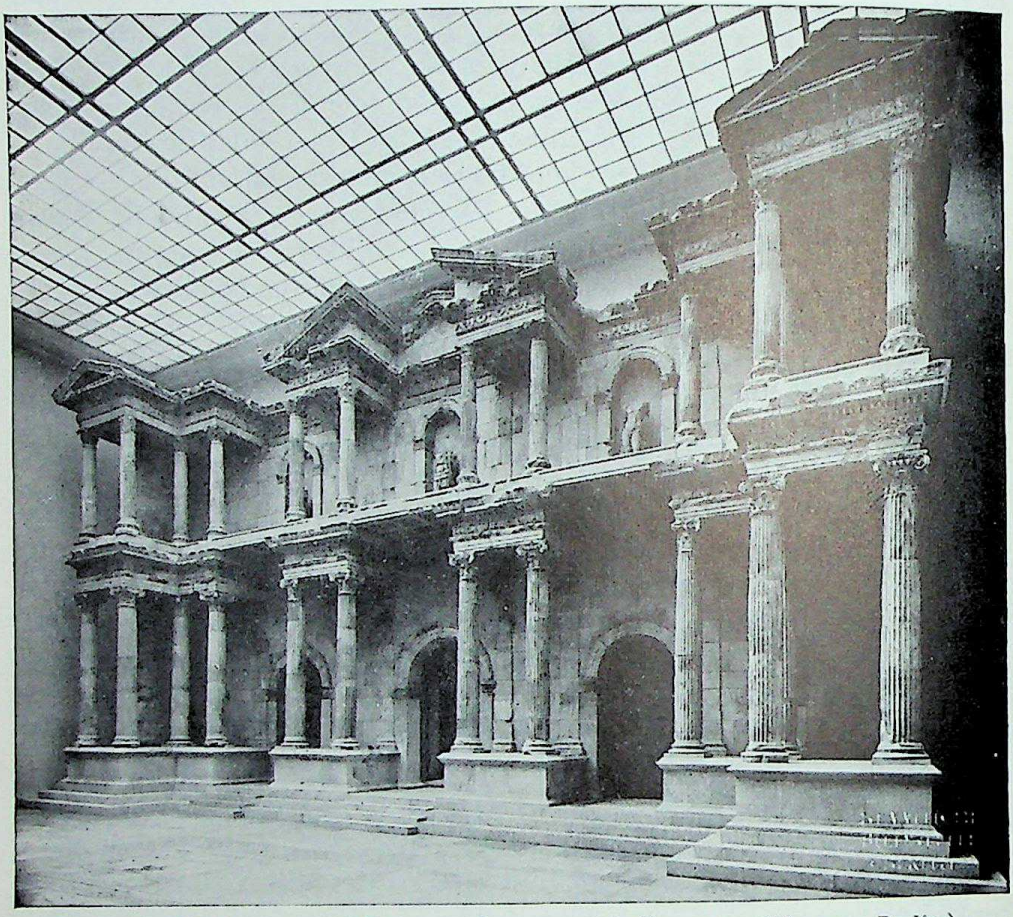


FIG. 33.—Market gate of Miletus. (*Courtesy of the Pergamum Museum, Berlin.*)

FOR FURTHER READING

BREASTED, J. H.: *Ancient Times*, Chaps. XIX–XXI
BURY, J. B., and Others: *The Hellenistic Age*
Cambridge Ancient History, Vol. VII, Chaps. I–IX
CARY, MAX: *A History of the Greek World from 323 to 146 B.C.*, Chaps. XV–XXI
COUCH, H. H., and R. M. GEER: *Classical Civilization. I. Greece*
FYFE, THEODORE: *Hellenistic Architecture*
MAHAFFY, J. P.: *Alexander's Empire*
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Chapter XII

FOUNDATIONS OF ROMAN CIVILIZATION

The Romans are the only people whose entire scroll of life can be unrolled before our eyes. With others, the picture is fragmentary. Either we cannot see them born, or we have not yet seen them die.—José Ortega y Gasset

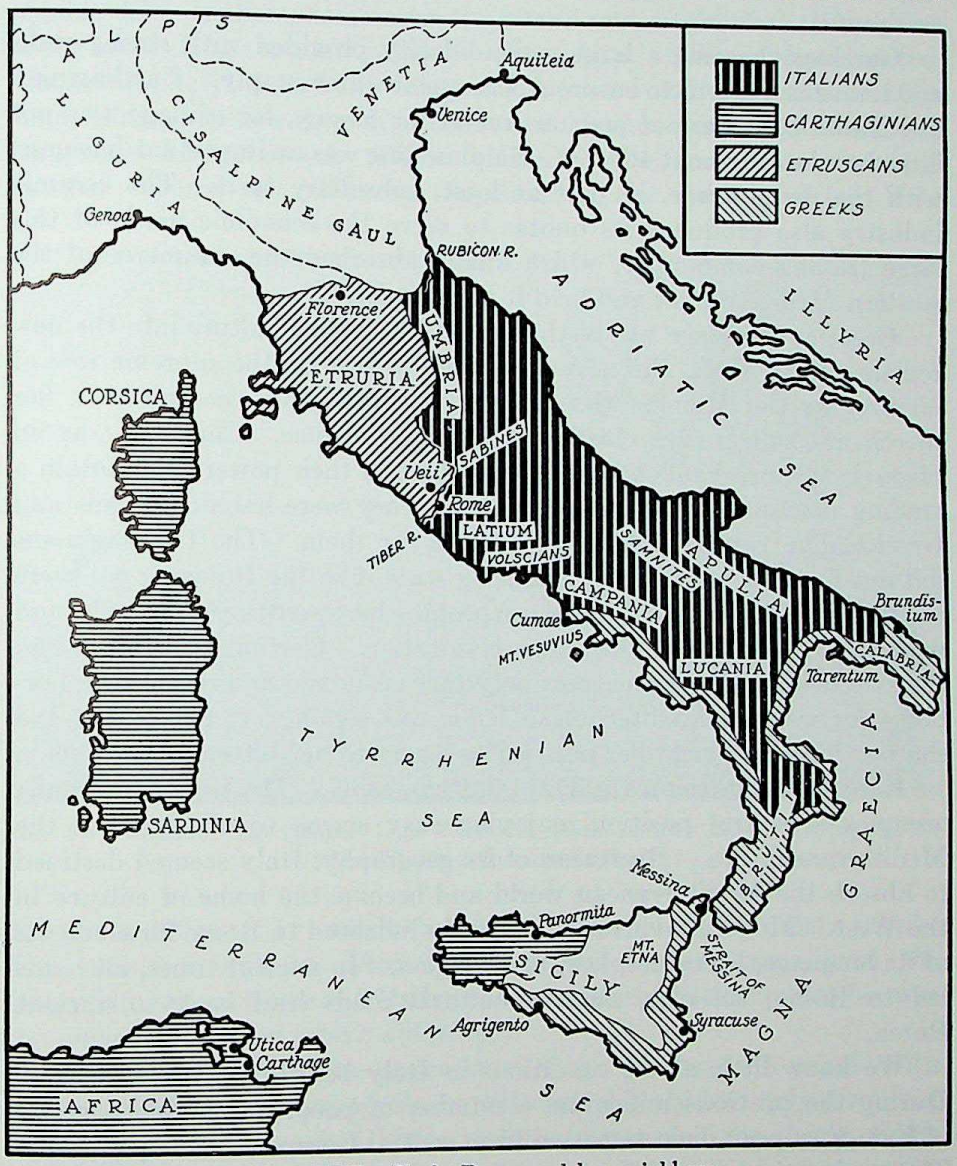
TO ROME, heir of the cultures of Greece, Persia, Babylon, and Egypt, we next turn our attention. A new state, founded on the banks of the Tiber, established its domination over the western half of the Mediterranean and finally extended its sway over all lands washed by its waves. Bounded by the Sahara on the south, the Rhine and Danube rivers on the north, and the Tigris-Euphrates Valley on the east, it cast its dominion over the seats of ancient civilization—Egypt, Sumer, Babylonia, Palestine, Phoenicia, and Greece. In the East, it continued the work begun by Alexander the Great—that of impressing Hellenistic features upon the life and thought of its peoples.

In the West, however, Rome's role as creator of civilization was even more vital. The population of these parts had lagged in cultural progress since the Neolithic Age, when the people inhabiting Spain and France had made noteworthy strides in the art of living. They still lived in small communities or tribes, practiced agriculture, raised cattle, wove cloth, carried on a slowly increasing volume of trade, and gradually learned the art of fashioning bronze and iron tools. From these diverse peoples of many languages and varied customs ultimately was forged the mighty empire of Rome, mistress of the Mediterranean world. The cultural unity that the Roman Empire created has never been lost; it was handed on to medieval and modern times, and as we today look back upon the "grandeur that was Rome" its function as diffuser of civilization becomes the more impressive viewed across such a span.

Phoenicians. The first eastern Mediterranean people to begin the systematic exploitation of western Mediterranean lands were the Phoenicians. These energetic industrial and trading folk brought the advanced arts of Eastern culture to the West. They established commercial stations in Spain, Sardinia, Sicily, and Malta and traded with the Fezzan, the Niger Valley, and the Berbers living on the African seacoast. Gold, ostrich feathers, and ivory came from the interior. Copper, quicksilver, and iron were mined in Spain. The Phoenicians also sailed along the Atlantic coast of Africa and traded with England,

from which they brought tin, a scarce metal coveted by makers of bronze tools and weapons.

Foremost among Phoenician colonies was Carthage, an offshoot of Tyre, founded about 800 B.C. on the northern coast of Africa. The



MAP XIII.—Early Rome and her neighbors.

Carthaginians spoke a Semitic language; their culture was much like that of their relatives in distant Phoenicia. They carried on an advanced agriculture and brought certain kinds of advanced fruit growing into the western Mediterranean. Cultivating the vine, olive, fig, almond,

and pomegranate, they introduced systematic methods of planting as well as scientific pruning and grafting. Better methods of stock breeding were also introduced. So successful were the Carthaginians in the arts of civilization that the Romans studied their methods with envy and profit.

Carthage became a large, splendid city provided with strong walls and immense cisterns to ensure a permanent water supply. Carthaginian merchants used bars of precious metal for money, for coinage was not introduced until about 400 B.C. Shipbuilding was an important business, with the metal trade, in part at least, subsidiary to it. The ceramic industry also produced its quotas to serve the economic needs of this large trading community, which finally absorbed the commerce of the western Mediterranian and held it as in a vise.

Great as Carthage was as diffuser of Phoenician culture into the new regions of the West, she never was able to assume the supreme role of civilizer as did Rome. Her culture was essentially commercial; her merchants had an eye chiefly to the main chance. Carthage was an oligarchy of merchants who did everything in their power to maintain a trading monopoly with their subjects. They were hated; Romans and Greeks alike rarely spoke a good word for them. The Carthaginians did not found a marvelously enduring state, like the Romans, nor were they able to any extent to absorb peoples by imparting the social and political advantages of their own civilization. Carthage therefore had the role of temporary greatness only; her economic and cultural importance for western Mediterranean lands was significant; but in the end she was forced to yield her position as leader to her bitter rival Rome.

Early Cultures on the Italian Peninsula. The Italian peninsula occupies a central position, enjoying easy access to all parts of the Mediterranean Sea. By reason of its geography, Italy seemed destined to absorb the Mediterranean world and become the home of culture in the West. Modern civilization is deeply indebted to Rome for elements of its language, literature, law, and religion. In ancient times, all roads led to Rome; so, also, modern cultural roads lead back to ancient Rome.

We know little about conditions in Italy before the year 1000 B.C. During the previous millenium a number of peoples speaking a group of Indo-European dialects passed from central Europe into the peninsula. These migrations must have been similar to the migrations of the Greeks. Collectively, these peoples may be called Italians because of the similarity of their languages, institutions, and religion. Best known among them were the Samnites, Umbrians, and Latins. They settled on both slopes of the Apennines, leading a simple agricultural and pastoral life much like that of the Greeks as described by Hesiod. Undoubtedly they

amalgamated with natives whose origins may be traced back to Neolithic or possibly even Paleolithic times.

Not until the Bronze Age is it possible to get glimpses of active life in the Po Valley. About 1000 B.C., immigrants from beyond the Alps, possibly lake dwellers, came over the passes and established themselves on the lakes along the southern slopes of the Alps. Some of them erected villages on piles; others built villages on dry land and dug moats around them, through which they diverted water, thus preserving the habit of using water for protection. These villages have been called "terramara." Another culture, the Villanova, appeared at the opening of the Iron

FIG. 34.—Etruscan sarcophagus from Cerveteri, sixth century B.C. (*Courtesy of the Italian Tourist Information Office.*)

Age about 900 B.C. It seems to be related to that of the terramara people. This new iron culture, which supplemented bronze, came from the Danubian valley, where the Hallstatt center of iron manufacture became the nucleus of a very active diffusion.

ETRUSCANS. Until the appearance of the Etruscans, a people with a more advanced culture, southern and central Italy had only a modest development. The earlier history of the Etruscans remains a riddle in spite of the zealous efforts of archaeologists, for their language, represented by over eight thousand inscriptions written in Greek letters, cannot be read. According to Herodotus, the Etruscans came originally from Lydia or Phrygia, in Asia Minor; and, confirming his opinion, modern scholars have found resemblances between the names of the places inhabited by them in Italy and in Asia Minor. Further, they

may have lived in close cultural contact with Babylonia, for their priests practiced divination and their soothsayers foretold events. Such practices, as we have learned, had been common in Mesopotamia since Sumerian times. These ideas about the origins of the Etruscans have been given greater certainty by the discovery in 1926 of an Etruscan cemetery on the island of Lemnos in the Aegean.

From about 800 B.C. the Etruscans were attracted to Italy because of the rich deposits of copper in Tuscany and iron on the island of Elba. They migrated in small numbers over many years and gave to the region west of the Apennines and north of Rome the name Etruria, from which the present name of Tuscany is derived. At times, however, their rule extended over a much wider area, to Capua in Campania on the south and to Bologna in the north. They exported copper to Asia Minor, receiving in return choice manufactured objects such as bowls, vases, and swords decorated with themes of Egyptian, Babylonian, and Phoenician origin. But the Etruscans soon began manufacturing for themselves; particularly fine bronze articles were made in profusion. Rivaling the workmen of Asia Minor, they exported superior wares to western Mediterranean lands and to culturally less advanced peoples north of the Alps.

Tuscany was covered with a primeval forest of oak and chestnut when the first Etruscans arrived. The newcomers introduced the olive and the grape, which even today are prominent features of the countryside. They lived as landlords among the native Italians, whom they reduced to serfdom. Games were important; such contests as javelin and discus throwing, wrestling, boxing, and running, borrowed from the Greeks, became popular. The women were remarkably free, in contrast with Greek society, for they appeared with men in public and at banquets and were well versed in soothsaying.

Veii, Tarquinii, and Vetulonia were a few of the more important towns. But the Etruscans never formed a solidly united state. Coming to Italy, as they did, in small groups, they established themselves in scattered places, forming semi-independent and warlike states that made a business of piracy. Some of these robber leaders, like the rulers of Vetulonia and Tarquinii, became powerful; others developed a navy so imposing that the Carthaginians were eager to have them for allies. Since united action of all the Etruscans was never possible, they could not maintain their power in the face of a strong, united foe. Etruscan ascendancy was built up piecemeal and disappeared in the same manner.

The religious ideas of the Etruscans, some of which later were adopted by the Romans, included the ritual of consulting the liver of sacrificed sheep to ascertain the will of the gods. Soothsayers foretold the future and even predicted the coming end of the Etruscan people. The human

being was believed to have a spiritual double, or *genius*. The Etruscans had vivid ideas about life after death, believing that it was much like that on earth; hence they built elaborate tombs provided with mural decorations, mortuary jewelry, and furniture. Paintings on the walls of tombs often depicted the deceased family gathered around a banquet and entertained by pipers and dancing girls. Others portrayed tormenting demons of the lower world and the sufferings of the damned. To appease the gods, human sacrifices were necessary, and opposing companies of men were forced to kill each other in a sort of sacrificial combat. It is believed by some that such contests later developed into the gladiatorial combats of Rome.

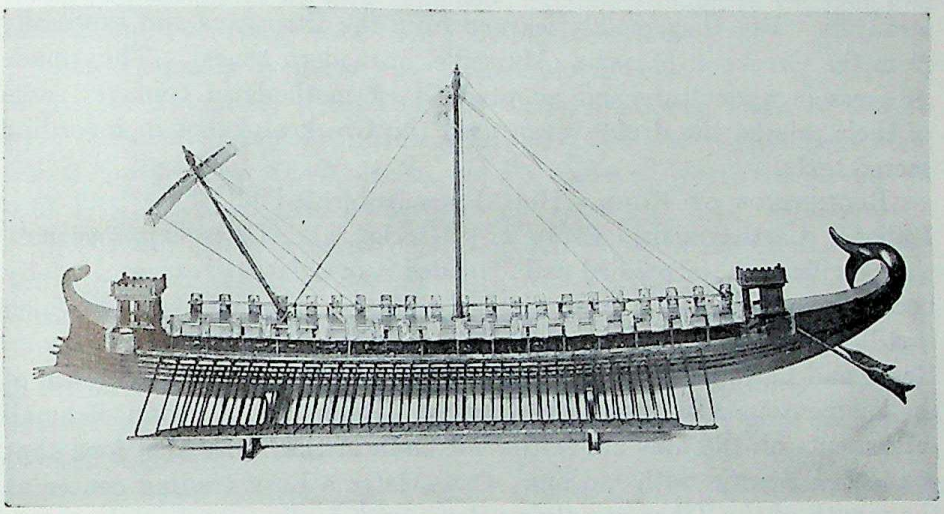


FIG. 35.—Athenian trireme from model, third century B.C. (*Courtesy of the Commercial Museum, Philadelphia.*)

GREEK COLONIES. Beginning about 800 B.C., the Greeks founded colonies along the coast of southern Italy, of which Tarentum, Thurii, Naples, and Cumae were the most prominent. Many more colonies were established in Sicily, especially Syracuse and Catania. These cities possessed all the features of Greek culture such as temples, theaters, baths, and gymnasiums. They carried on a profitable trade in objects of Greek manufacture, mostly Corinthian and Attic ware, introduced the vine and the olive into Italy, and, in general, served as active centers for the diffusion of Greek culture. But the Greeks of Italy, like their relatives in the homeland, could not maintain their independence against the growing power of Rome. Only Syracuse was able to assume some semblance of leadership at critical moments. She, at least, was successful in checking the Carthaginians, who resented the efforts of Syracuse to win trade in the western Mediterranean.

Celts, or Gauls. In this picture of the Western world we must also include the Celts, or Gauls. They spoke an Indo-European language, and their first appearance may be traced back to the lands along the Danube. While in these regions, they came in contact with the iron culture of the Danube Valley and learned to produce copper, bronze, and iron tools. Their early history is uncertain, for they mingled readily with other peoples and merged quickly into the regional culture. Crowded by the Germans from the north, the Celts began to move westward into Gaul about 500 B.C. and also occupied the British Isles. As we know, they invaded the Balkan Peninsula and Po Valley, pressing upon the Etruscans and even attacking and sacking Rome in 390 B.C. So different were the Celts from the Italians that they were regarded as utter strangers. But they readily learned from the Etruscans and especially from the Greeks in Massilia (Marseille, in modern times). They made progress in agriculture and adopted Greek methods of coinage; some of their priests, the druids, even used the Greek alphabet in recording sacred texts.

Beginnings of Rome. How Rome subjected all these peoples—Italians, Carthaginians, Etruscans, Greeks, and Celts—appropriated their civilization, intensified and extended it over large areas, and finally became the center of a wide cultural diffusion, the influence of which is still with us, is one of the great achievements of history. In 800 B.C., Rome and Latium, the country south of the Tiber, gave no evidence of the momentous role they were to play. Rome was a group of small settlements on the hills above the left bank of the Tiber at a ford that connected Etruria with Latium. Ostia, later a busy trading center at the mouth of the Tiber, supplying Rome with foreign goods and exporting Roman articles, had not yet become important. No one could possibly have predicted that this obscure Roman people would, in the course of a few centuries, rule the entire Mediterranean world.

Rome's earliest history is legendary; only by means of archaeology can we form some idea of what took place. It is certain that the Roman peasants and petty traders on the Palatine, Esquiline, and Capitoline Hills were subjects of Etruscan princes ruling in Rome. Early legends say so, and Etruscan influences are to be noted everywhere in Roman life. The curule chair, a prerogative of Roman magistrates; the fasces, a bundle of rods enclosing an ax borne by lictors accompanying magistrates; the arch and the vault, characteristic Roman architectural devices; such practices as soothsaying and divination by means of the liver of sheep; and belief in genii—all were Etruscan practices and beliefs. Furthermore, two of the early kings of Rome bore the name Tarquin, which archaeologists have discovered in inscriptions on Etruscan tombs. There were seven kings in all, according to tradition, the last of whom

was expelled in 509 B.C. With this bloodless revolution, Etruscan lordship came to an end. But Roman culture, which at the beginning had drawn heavily upon Etruria, never lost some of its original Etruscan characteristics.

ROMAN CONQUESTS AND GOVERNMENT. Rome was the greatest conqueror and organizer of subject peoples in ancient times. Accomplished more slowly than those of Alexander the Great, her conquests also differed profoundly from them. In the Hellenistic states of Asia and Africa the natives became only partly Hellenized at best, and thus old languages, religion, and ideas showed little change. But in the lands of the West over which Rome first extended her sway, the native populations adopted Latin as their language, became Roman in thought and feeling, and eventually took their religion from Rome.

The conquests by Rome may be listed as follows:

1. The Samnites, Etruscans, and Celts, or Gauls, south of the Po were defeated in 295 B.C. During the next few years, Rome extended her authority over the Celts in the Po Valley. Next, the Greeks in southern Italy were reduced by 270 B.C.

2. Roman trade interests conflicted with those of the Carthaginians. Three wars resulted, in 264–241 B.C., 218–202 B.C., and 149–146 B.C. Carthage was destroyed; her subject territory became Roman.

3. Gradually Rome absorbed the Greek East. Corinth was destroyed in 146 B.C., which terminated her commercial rivalry with Rome. Greece, Macedonia, Pergamum, Syria, and finally (in 30 B.C.) Egypt fell under Roman domination.

4. All Gaul between the English Channel and the Mediterranean was conquered by Julius Caesar between 58 and 49 B.C.

An outstanding trait for which the Romans were noted was their rigid conservatism; it lay at the foundation of their culture and made possible their success in government. So intensely conservative were they that they never cared to do things in new ways. This quality produced a deliberate and orderly development of their political institutions, which can be traced in detail from the expulsion of their kings to the end of the empire in the West in the fifth century A.D. In the East, characteristic Roman ideas may be identified in the medieval Byzantine Empire, which became the heir of the Roman Empire. This long continuity of political experience produced the ripest legal knowledge the world had yet seen.

ROMAN SOCIAL SYSTEM: THE FAMILY. Roman ideas of the family went back to the simple agricultural life of Latium. The father was *pater familias*, that is, head of the family, to which belonged the mother, the daughters until they married, and the sons with their wives and children. He was master of their property and even of their lives.

This authority, called *patria potestas*, ceased upon the father's death. A group of families constituted a *gens* (plural, *gentes*). From the *gens*, each male member received his distinctive name, which normally followed his given or, as we should say, Christian name and preceded his family name. Thus, in the case of Marcus Tullius Cicero, "Tullius" indicates

FIG. 36.—Roman house, peristyle with garden. (*Courtesy of the Metropolitan Museum of Art.*)

that he belonged to the *gens* of Tullus. The given name, as in some of our families, was handed down from father to son through many generations and was at least partly suggested by religion. It was believed that each human being had a genius that, hovering about the grave and house, required offerings to make it contented. Therefore, the paterfamilias saw to it that such filial duties were regularly performed. Reverence for ancestors, moreover, created intense family pride. These

beliefs and practices instilled deep respect for the *mos maiorum*, the tradition of the fathers.

Position of Women. Women occupied an enviable position in Roman society and, in contrast to Greek women, appeared in public on all occasions. At banquets, they sat with their husbands. Many a Roman woman became noted for the elegance of her language and her ability to entertain. She was mistress of her house; upon her devolved the task of teaching and bringing up children, directing slaves, and assisting in the management of her husband's business. Sometimes she gave evidence in court. Roman women enjoyed the deepest respect from all members of society; when they appeared alone in the streets, men considerately made way for them. Their exalted position made them self-reliant, which helped to create the stable and conservative character of Roman families. It is evident that the Romans borrowed much from the Etruscans in this respect and little from the Greeks.

Religion. The practical and matter-of-fact nature of the Romans is well shown by their religion. Not boldly imaginative like the Greeks, they conceived of their gods as being vague spirits possessing personality only in a slight degree. They were mostly ancient fertility gods associated with agricultural and household life. Among them were Vesta, goddess of the hearth fire; Janus, god of the doorway and all beginnings; *genius familiae*, the spirit of the family; and the *lares*, spirits of fertility and the household. There were community cults of the vineyard, sowing, and harvest. In addition, the Romans supported the state cult of an old sky god, Jupiter Optimus Maximus, or Jupiter best and greatest, guardian of the state. Juno, his wife, was the protectress of women. Mars was god of war and all things associated with it. One remarkable feature of Roman worship was its legal and practical character. It was in the nature of a contract; if one's rites were correctly performed, the gods were bound to carry out their part.

Political System. Rome became a republic upon the expulsion of the kings; but instead of changing the nature of their government the Romans merely substituted elected consuls for the kings. The object in having a college of two consuls was to prevent absolutism, for each consul could veto the acts of his colleague. A college of officials, or magistrates, was a specifically Roman idea that the state never outgrew. Two consuls were chosen annually; their duties were essentially the same as those formerly exercised by the kings. The senate, composed of senators or elders, was a kind of council in which the more important individuals in the Roman city-state all had seats. Its political authority was very great; for example, it conferred the imperium—the power of the consuls. Besides the college of consuls there were colleges of praetors, or judges; quaestors, or treasurers; aediles, or police magistrates;

and tribunes, or protectors of the plebs, the lower classes of the populace.

Control of the government lay with the chief families, who sat in the senate and long constituted the directing force in the state. The senators deliberated on all questions and controlled the acts of the consuls. They were the wealthiest citizens of Rome, owned much of the land, were conservative, and formed the patrician class. They also controlled the *Comitia centuriata*, or assembly of centuries, the chief voting body of the Roman people, which met on the Campus Martius, or field of Mars, just outside Rome, to make laws and elect magistrates. This assembly was divided into five classes on the basis of property ownership, the first class and cavalry paying the largest share of the taxes. Voting was by groups, called centuries, of which there were 193, each century having one vote. The first class and the cavalry together had ninety-eight votes; the rest had only ninety-five votes. The wealthy therefore had a majority of votes and so controlled the Comitia centuriata.

The poorest class of Romans were the plebs, who had little or nothing to say about the conduct of state affairs but were nevertheless responsible for their acts to the magistrates. Further, they often shared the burden of war equally with the patricians. This was serious because the poor, who like the wealthy served at their own expense, could ill afford to maintain themselves away from their little farms during spring and summer. The plebs accordingly were heavily in debt to the well-to-do patricians, who in exacting full payment reduced them to slavery. As the population of Rome grew and commerce increased, some of the plebs succeeded in becoming wealthy. They resented the exclusiveness and privileged position of the patricians and led their fellow plebs in revolt. The senators gradually yielded to avoid in Rome the disastrous class wars that had so harassed the Greek city-states. Henceforth (possibly from 466 B.C.), tribunes were elected by an assembly of the tribes, or *Comitia tributa*, the legislative assembly in Rome in which voting took place by tribes. The tribunes had authority to veto a consul's action when one of the plebs appealed for help against any consular act. To make their authority respected, tribunes were authorized even to kill a magistrate who refused to regard the veto. Gradually, as Rome's power increased, the plebs's power grew so that they were able to wrest more and more privileges from the conservative patricians.

Relation with Other City-States. The successful government of independent city-states was ever a difficult problem in classical antiquity, and the Roman solution proved of great importance in the history of politics. Its main theory was that the republic of Rome as a city-state should rule as head of a federal organism of allied city-states.

Communities might be joined to Rome by conquest or treaty; in either case, the relations between the two parties were carefully specified. Usually, the inhabitants of a subject city-state were given the right to sue in Roman courts for breach of commercial relations and to contract legal marriages with Romans. Such rights of commerce and marriage were generally accorded, but the military policies of subject city-states were all controlled by Rome. Internal administration concerned solely with such local affairs as city walls, markets, theaters, and police regulations was left to local governments. Unity and diversity were the rule. Subjects soon learned that the welfare of Rome was their welfare and, sharing in the benefits of peace that Rome gave to them, came to regard themselves as true Romans. So the culture of Rome, drawn from a multitude of sources, was diffused by the Roman state to all subject municipalities.

LITERATURE. Originally tillers of the soil and schooled in hard work and adversity, the early Romans had shown little interest in literature and the other arts. Mistrusting the nimble ways of the Greeks, they long remained suspicious of their culture. Gradually, however, as the Romans annexed and conquered Italian and Carthaginian lands, they began to admire the ways of their new subjects. Greek influences eventually became strong in Rome; a Greek prisoner of war from Tarentum, named Lucius Livius Andronicus, became a teacher in Rome and made a translation of the *Odyssey*. At about the same time, Gnaeus Naevius, a native Roman, began making translations from Greek tragedies and produced a Roman epic, *Bellum Punicum* (*War with Carthage*). Quintus Ennius, a Greek from Calabria, wrote the *Annales*, which long remained popular.

The first truly successful Roman literary productions were the comedies of Plautus (*d.* 184 B.C.) and Terence (*d.* 159 B.C.). Plautus wrote plays to delight the city audiences, which became numerous during the Punic Wars. His twenty extant plays present a wide variety of characters like those of the Greek Menander, by whom he was deeply influenced. Centuries later they were imitated by Shakespeare, Molière, and the *commedia dell' arte*, the popular comedy of the Italian Renaissance. Plautus's *Menaechmi*, closely imitated by Shakespeare in his *Comedy of Errors*, presents twin brothers, who after long separation come together without recognizing each other; the resulting confusion produces amusing episodes. Like Plautus, Terence also was profoundly influenced by Menander. His comedies are as important as those of Plautus, for they were studied and even acted throughout the Middle Ages. The Saxon nun Roswitha in the tenth century A.D. imitated Terence in her pious plays, carefully avoiding all that seemed improper in the originals.

Cultural Changes. Other aspects of Hellenistic culture were adopted, especially when Rome entered into direct political relations with the Greek East after the conquest of Corinth in 146 B.C. The Hellenistic historian Polybius spent many years in Rome with the families of the Scipios and other prominent Romans, thus securing at first hand the materials for his *Histories*. Greek philosophers also came to Rome, with the result that Epicurean philosophy was adopted by some of the younger Romans who disliked the old ideal of sobriety and respect for traditions and the gods. Stoicism, however, better fitted the grave Roman temper and was accepted by many of the more responsible citizenry. Under such impacts the traditional religion also changed: the shadowy divinities became transformed into Greek gods, the twelve Olympian deities being identified with the twelve chief gods of Rome. Jupiter and Zeus were one and the same; so also were Juno and Hera, Minerva and Athena. In addition, strange gods were introduced, Isis and Serapis from Egypt and the Earth Mother goddess from Asia Minor.

The sturdy character and simple habits of the Roman people, as well as their culture, changed rapidly after the Punic Wars. Trade increased; plunder from captured lands flooded Rome. Captives taken in the many wars were sold as slaves, drugging the market with cheap labor. This was disastrous to agriculture because it ruined the free farmer by creating great plantations called *latifundia*, worked by gangs of slaves. The flood of undeserved wealth brought with it moral disintegration; governors abused their position and squeezed enormous sums from the helpless provincials; merchants amassed fortunes by dubious methods; and many of the equestrian class became speculative financiers, loaning huge sums at exorbitant rates of interest.

Fall of the Republic. Such conditions produced a grave crisis in society and government. The free farmers who could no longer make a living in the country crowded into Rome, where they had to be supported by state doles of grain. The lower classes in Rome loudly insisted on reform. Profiting from these abuses, the senators were unwilling to cope with the situation. Their relations with the proletarian crowd became more and more strained and bitter. Popular leaders appealed to the mob; a redistribution of land was demanded. When conservative and propertied senators objected, civil wars resulted. Ambitious men, using the support of the mob, were given special commands affording great opportunities for spoil. Among such men were Marius and Sulla, Pompey, who cleared the Mediterranean of pirates, and Caesar, who conquered Gaul. The first century B.C. was filled with the civil wars of these rival opportunists, whose ruthlessness ruined public welfare and threatened to destroy the Roman state. Only when the dictator Augustus established unity after destroying all opponents

in 27 B.C. was the crisis averted. This was accomplished, however, at the cost of the republic, which gave place to a new empire.

FOR FURTHER READING

ABBOTT, F. F.: *Society and Politics in Ancient Rome*
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CARTER, J. B.: *Religious Life in Ancient Rome*
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Chapter XIII

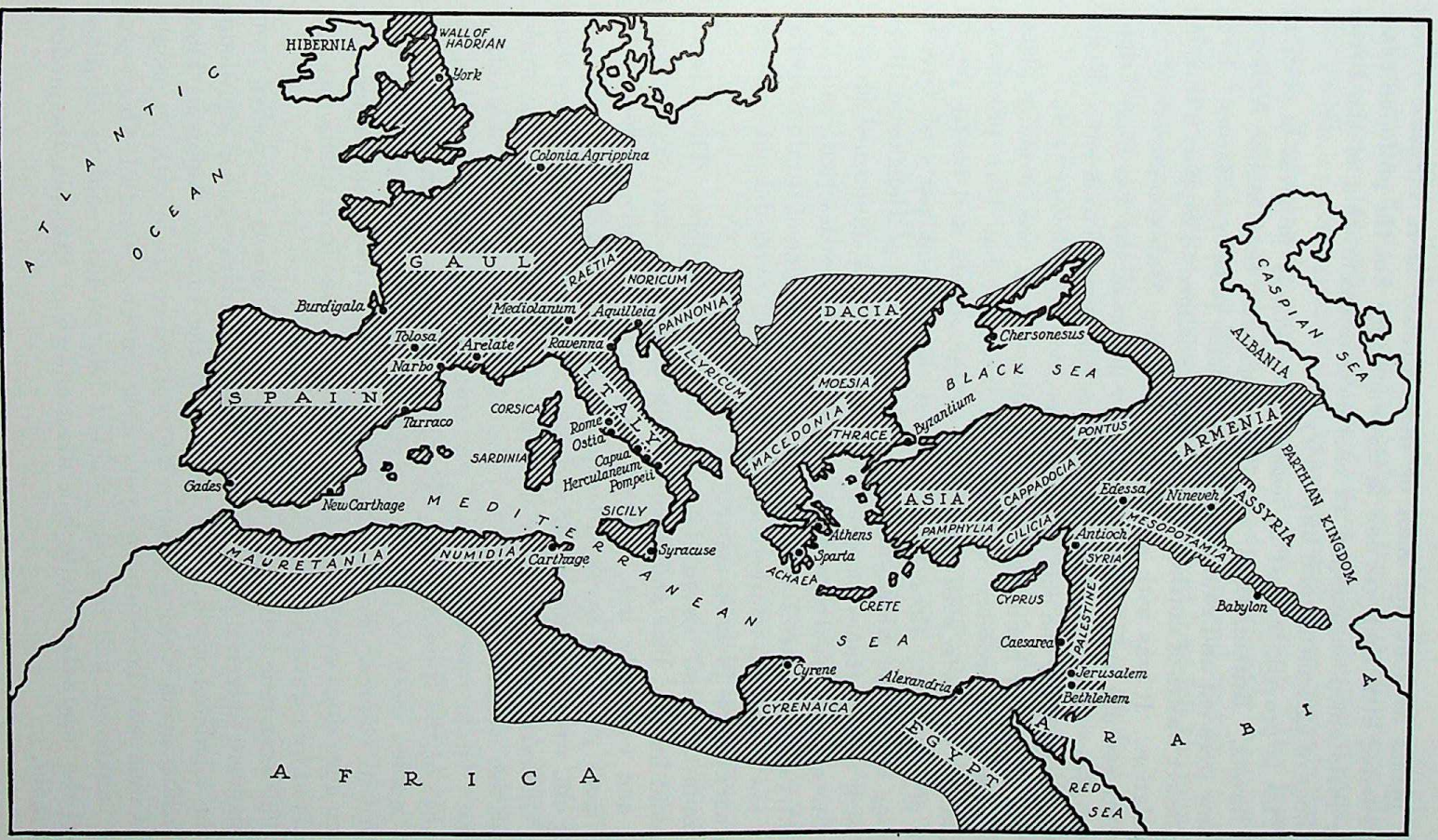
ROMAN CIVILIZATION

The commonwealth of kings, the men of Rome!—Byron

Effects of the Establishment of the Roman Empire. The Roman Empire, established by Augustus in 27 B.C., was of the first importance in the history of civilization. Ever since man first appeared in the lands around the Mediterranean Sea and in western Europe, he had lived in small groups or tribes. The Greeks had developed an orderly city-state on a scale larger than the tribe; but though endowed with keen intellect and great ability they failed to unite and establish peace among themselves. The Romans achieved what the Greeks failed to accomplish; in addition, they brought the diverse peoples of the western Mediterranean under their sway, thereby creating a new condition of unity and harmony, the *Pax Romana*, or Roman peace. From Scotland to the Sahara, from the Atlantic Ocean to the Tigris-Euphrates Valley, all peoples were subjected to the civilizing influence of Rome, which indelibly stamped upon them the marks of Greco-Roman culture. Subsequent ages were never able to outdo this unique achievement.

There is a striking parallel between the conquests of Alexander the Great and the conquests of the Romans. Alexander seized vast sums of precious metal, which he spent in various projects that stimulated public prosperity; the great increase in the volume of coined money energized trade, industry, and agriculture. The Roman conquerors of the first century B.C. also seized huge spoil from conquered peoples, and every military victory was followed by the shipment of booty to Rome. Great sums were exacted as tribute, and business agents, bankers, and speculators throve. Fortunes were made overnight. This effective stimulus produced a period of prosperity that continued for almost two centuries, the happiest age of the Roman Empire.

The condition of universal peace created by Augustus was firmly established by the organization of the Roman Empire. All parts of the ancient civilized world—Egypt, the Tigris-Euphrates Valley, Palestine, Phoenicia, Greece, the Carthaginian lands of northern Africa—were given a new economic order. From one end of the ancient world to the other, new forces began to pulsate through agriculture, industry, and business. Not that the Romans discovered and exploited many



MAP XIV.—The Roman Empire at its greatest extent (about A.D. 100).

new plants as food for man or domesticated more animals. They contributed little that was new in these matters, but the profound peace they maintained encouraged an enormous intensification of the better methods of agriculture and husbandry.

This is proved, in part at least, by the steady progress in clearing the forests. Britain, Gaul, the Rhineland, and the Danube Valley—all saw trees cut and swamps drained to make prosperous farms. Even the desert wastes of northern Africa were reclaimed to support a thriving population. It was with amazement that the Arab conquerors of the seventh century rode in the shade of olive groves all the way from Tripoli to Tangier. Today much of this territory has reverted to desert. Horticulture, especially the culture of the vine, progressed everywhere.

On the other hand, thin soil of southern Italy was in many places worn away by erosion. Communities that once had been prosperous could not compete with other parts of the empire and nearly passed out of existence. Erosion also ruined many rural parts of Greece, having forced the inhabitants, since the beginning of Hellenistic times, to seek their fortunes in other lands. Population diminished steadily in Greece as in southern Italy, many farms were deserted, and vast countrysides reverted to wilderness. But this decline of rural prosperity in a few places like southern Italy, Greece, and Syria did not outweigh the agricultural progress apparent in other places.

Industrial and commercial gains also were evident. There was a demand for salt, lime and building materials, gold, silver, copper, lead, tin, and especially iron. There was much commerce in foodstuffs; the hams produced by the Menapii, a people living in what today is Belgium, were exported as far as Italy. Fish salted in the cities along the Mediterranean coast were shipped to all parts of the Roman world. Fresh fish caught in the lakes of the Alps were sold in the markets of Rome. Grain raised in Britain was transported to the Rhineland for the use of the Roman army. There was an active commerce in wool and woolen cloth of all sorts. Trade in luxuries from the Far East gained in volume. From India and the East Indies came spices, for which huge sums were gladly paid. Silk cloth came from China, brought overland by caravans of camels.

This economic activity, widely diffused and highly intensified from the moment universal peace was established, greatly extended knowledge of the inhabited world. The Romans of the time of Augustus knew something about Ceylon because they carried on trade with its people, but China was known only from vague rumors. Central Africa was quite unknown, and only the slightest information could be obtained about the headwaters of the Nile River and about Ethiopia, the modern Abyssinia.

By A.D. 200, all this had radically changed. Romans occasionally visited the Far East; in A.D. 166 an embassy sent by the Emperor Marcus Aurelius (A.D. 161–180) visited the Chinese capital on the Hwang Ho. Meanwhile, overland trade in silk cloth continued along the route through Eastern Turkestan by way of Yarkand and Kashgar. The Romans penetrated the Sahara as far as Lake Chad and possibly even reached what later became French Equatorial Africa. Ireland, Scotland, Scandinavia, and the Baltic seacoast were visited or at least felt the influence of Roman economic life.

Organization of Roman Empire. Management of the vast Roman Empire was vested in the senate and the emperor. Because the senate was unable to shoulder all the cares of government, it was allowed to retain control only of the peaceful provinces in the interior. The emperor managed the more turbulent frontier provinces and the army. His imperium was superior to that of the governors of senatorial provinces. He was given the titles of "Augustus" and *imperator*, or commander, the latter finally becoming equivalent to our "emperor." The authority of a tribune was also bestowed upon him. Theoretically, Augustus (*d.* A.D. 14) was but an officer in the Roman state; but the accumulation of so many powers made him the first and most powerful and influential citizen of Rome, a position reflected in the title of *princeps* now accorded him. The government of the princeps, or emperor, is usually called the "principate," but it is also called the "diarchy" because of its dual character. We shall ordinarily refer to it, however, as the "empire."

Gradually the emperor's power grew at the expense of the senate, an evolution hastened by the Civil Wars and the threat of barbarian invasions from A.D. 235 to 285. The army became more important than ever, and an opportunity was thus provided for the emperor as commander in chief to use its power to supplant the senate as the governing force. Henceforth, the senate's activities were restricted more and more to purely local questions. The old principate passed away, and a new order emerged. At last an absolute state, frankly a dictatorship, was founded by Diocletian, who reigned from A.D. 284 to 305.

The empire was still a vast organization of city-states, or municipalities, each one composed of an urban center with a dependent rural area. These municipalities continued to manage such internal matters as the police, streets, walls, gates, and markets. The wealthier citizenry formed a class of *curiales*, or curials, who sat in the *curia*, the municipal senate, and regulated municipal affairs. External affairs such as coinage, war, and diplomacy were managed by the senate if the municipality was situated in a senatorial province, by the princeps if in an imperial province. A vast network of magnificently constructed roads bound

the municipalities together and facilitated travel and business. The municipalities, at least in the first century A.D., were prosperous; on every hand were to be seen commemorative arches, aqueducts, theaters, temples, baths, waterworks, walls, gates. Impressive tombs lined the principal roads leading into the cities.

Appearance of Rome. Rome now became the most splendid city in the world. It had already grown large during the republic, but it was not beautified until after the empire came into existence. Augustus

Fig. 37.—Porta Nigra, or Black Gate at Trier. (*Courtesy of the German Railroads Information Office.*)

started the precedent as an energetic builder; and the fire of A.D. 64, which raged for nearly a week and laid the larger part of the city in ashes, made possible rebuilding on a large scale. The central sections were crowded with splendid buildings of gleaming marble. The Palatine Hill was the abode of the Caesars. The valley between it, the Esquiline, and the Capitoline Hill—the Old Forum, or business section—was filled with new and magnificent buildings. Vespasian built the Colosseum about A.D. 86 at its southern extremity. The Sacred Way, lined with temples, statues, the senate house, triumphal arches, market places, and basilicas (courts of justice), became the most magnificent street in the world. Winding through the Old Forum, it led to the summit of the

Capitoline Hill, where stood an imposing temple sacred to Jupiter. Julius Caesar had added a new forum just to the north of the old one. Augustus erected another still more magnificent—an example followed by the emperors Vespasian, Nerva, and Trajan. Hadrian built a beautiful temple at the north end, a short distance from the Campus Martius, formerly a drill field but now covered with buildings such as the Pantheon, Pompey's Theater, and the Baths of Agrippa.

Roman Literature: Cicero. At first the Romans were far behind the Greeks in the higher arts of civilization. In literature they had produced nothing worthy of mention by the time of the Punic Wars, which came to an end in 146 B.C. Their first literary possessions, as we have observed, were rude translations of Homer's *Iliad* and *Odyssey*. Even the writers of comedy, Plautus and Terence, borrowed heavily from Greek dramatists. Charmed by the beauties of Greek poetry, drama, and prose, educated Romans were content to imitate them. They became "eclectics," people who build up their artistic taste or philosophic conceptions by borrowing from a number of different sources.

Such an eclectic was Cicero, whose name will ever be associated with the violent days of Julius Caesar and his opponents. Born in 106 B.C., he was slain by the supporters of Mark Antony in 43 B.C. He was preeminently an urbane man of letters, commenting in polished prose upon the problems of the day. Oratory was as important in Rome as it had been in the Greek city-states before they lost their independence; thus Cicero, an orator of the first rank, easily assumed leadership in the senate. His speeches were composed with great care, their melodious sentences being peculiarly impressive.

The *Orations against Catiline*, for centuries read by schoolboys, have given many writers their idea of what constitutes beautiful and effective prose. *On the Orator* deals with the sort of education a Roman citizen should have to play a useful part in the state. Cicero's political philosophy is presented in his *On the State* and *On the Laws*. His *Letters*, many in number, give us the varied impressions that this busy and acute man formed of the Roman state and society. As a writer of letters, Cicero has had few equals; in fact, it would be difficult to name a more universally influential author.

Horace. Horace (65–8 B.C.), a friend of Augustus, lived during the hectic days when the republic disappeared and the empire was created. He was gay, cultivated, elegant, and urbanely satirical. His poetry, marked by great versatility, exercised a profound influence over writers of the Renaissance and modern times. He will forever be known as the genial author of the *Satires*, a type of literature peculiarly Roman that came into existence as early as the second century B.C. The *Satires* are short compositions dealing with all sorts of intimate matters, essays

on human foibles treated with trenchant wit. The one in which Horace describes his trip from Rome to Brundisium is peculiarly interesting. His polished *Epistles*, written to friends many of whom were intimates also of Augustus, are equally important to the historian and the student of literature. Horace likewise wrote lyrics, the *Odes* and the *Epodes*, which have been admired in every age. Some of them deal with patriotic themes, as when Horace voices fervent thanks for Augustus's statesmanship, which put an end to the anarchy and terror of the Civil Wars. This is well expressed in his last ode.

> While Caesar guards, no strife of civil coil,
> Nor foreign stroke our country's peace shall fret,
> Nor leaders' quarrel, swords to whet
> Or hapless towns embroil.
>
> The Julian laws those shall not break, who drink
> From Danube's stream, nor Goths, nor Chinese foes,
> Nor treacherous Parthians, nor those
> Born by Don's river-brink.
>
> But we, alike on feasts and working days,
> The merry Bacchus' gifts before us spread,
> After fit pray'rs to Heaven are said,
> With wives and babes shall praise,
>
> As did our sires, brave men whose work is done,
> In songs that with the Lydian flute combine;
> Troy too, Anchises, and the line
> Of gentle Venus' son.[1]

VERGIL. Even more than Horace, Vergil (70–19 B.C.) was a spokesman of the dying republic and the dawning empire. Few writers have had so perfect a mastery over their mother tongue. His influence has been enormous; many have imitated him, but rarely if ever has he been equaled. His *Eclogues*, poems in which shepherds usually provide the dialogue, were obviously inspired by Hellenistic models, especially the poems of Theocritus. The fourth eclogue tells of the coming birth of a child whose advent had been foretold by the Cumaean sibyl and who would bring to the world an age of peace and happiness. Medieval writers thought that this child was none other than Christ. They even fancied that Vergil had drawn his inspiration from the Jewish prophet Isaiah. But it is more probable that the writer had Augustus in mind, bringing peace to the war-racked state, reestablishing prosperity and security.

[1] *The Complete Works of Horace*, tr. by Various Hands, p. 111, Everyman's Library, J. M. Dent and Sons, Ltd., London, 1927.

His *Georgics* are poems dealing with farm life in Italy, which Vergil loved so deeply. The beauty of Italian landscapes, cool groves, sounding streams, growing crops, and fragrant fields, elicited his enthusiastic praise. In these, too, he drew inspiration from poets like Theocritus.

> What makes the valleys laugh and sing, what star
> Should speed the plow and marry vine to elm,
> The care of kine and how to rear a flock,
> What skill shall keep the parsimonious bee,
> Hence is my song, Maecenas. O ye stars
> The brilliant escort of the gliding year,
> Liber and bounteous Ceres, if ye bade
> Earth change the acorn for the fattening ear,
> And with pure water mix the new-found grape;
> Ye Fauns, the guardian angels of the farm,
> Ye Fauns, and Dryad maidens, join the dance;
> I sing your favors.

But it is in the *Aeneid*, the greatest of epics after Homer's *Iliad* and *Odyssey*, that Vergil attains his true stature. This is a long poem in twelve books, written in the meter of Homer. It traces the descent of Rome through the hero Aeneas, who snatched the household gods from burning Troy and with their aid succeeded in founding Rome. The Roman people were predestined to rule over all peoples, according to Jupiter in the *Aeneid*.

> For them I set no bounds of empire,
> Nor dates, but rule without end have I granted.

Of Augustus's great work Vergil wrote as follows:

> Hither now cast thine eyes; behold this people.
> They are thine own Romans. This is Caesar,
> And they are all the sons of Julius, predestined
> To pass under the great vault of Heaven;
> Here is the man you oft have heard promised—
> Augustus Caesar, born of god, to found anew
> The golden age in Latium's fields
> Where once Saturn ruled [Book VI, lines 786 to 794].

It is impossible to overemphasize Vergil's influence. Expressing eloquently the hope felt in many breasts for the success of the new empire, his voice was one of joyous prophecy at a time of transition, confusion, and doubt in public life.

Ovid. Ovid (*d.* A.D. 17) enjoyed a reputation and influence almost as great as that of Vergil. Product of the wealthy, decadent society of the early empire, in his *Art of Love* he reflects society's easy morality and lack of serious purpose. He was a skeptic in regard to all religion, and

the stories of the gods served only as material for his matchless art. The *Metamorphoses* in fifteen books is a collection of tales drawn from Greek mythology. Ovid produced a magnificent group of stories to which most subsequent writers and painters owe their knowledge of classical mythology. Medieval writers like Boccaccio and Chaucer borrowed much from him, and the painters of the Renaissance turned to the *Metamorphoses* for the inspiration for their magnificent scenes. As a master of style, Ovid had no equal in the Roman world. He knew every trick of rhetoric, and his verse employs deft and subtle phrases that enchant all who read them.

Pliny the Younger. Pliny the Younger (*d.* about A.D. 114) was an accomplished stylist who wrote a large number of letters couched in superlative rhetoric. They present a host of interesting facts about life under the empire, especially during the principate of Trajan from A.D. 98 to 117. As a public official, for many years, he had ample opportunity to become well informed on all state matters. His description of the eruption of Vesuvius (A.D. 79) is especially famous.

Philosophy: Epicureanism. Philosophy was not popular at first among the Romans. Being a practical people, they took little interest in abstract thinking. They developed no new schools of philosophy but drew their ideas from the Hellenistic East. Epicureanism particularly appealed to the wealthy young Romans who disliked the old disciplines. They welcomed arguments justifying indifference to the old religion and its restraints. The finest expression of this attitude is the poem *On the Nature of Things* by Lucretius (*d.* 55 B.C.). Its philosophy based upon the atomism of Democritus holds that as life is but an accidental combination of atoms there can be no immortal soul, no gods, and no eternally existing Ideas as Plato taught. Book V ambitiously relates how life began and how it evolved, sketches the earliest ages of man, and gives an outline of civilization. Though fanciful, it is a remarkable exposition. It would be interesting to compare his sketch, point for point, with the outline of man's earliest history through the Paleolithic, Neolithic, and Bronze ages given in the first chapters of this book.

Stoicism. Stoicism appealed strongly to the serious Roman, with his deep respect for old and tried ways. Although it appeared in Rome during the Punic Wars, the first really able writer to champion the Stoic doctrine was Cicero, the most influential of his philosophic writings being *Tusculan Disputations*, *On Old Age*, and *On the Nature of the Gods*. The respect that Stoicism enjoyed in later ages is partly due to these books. Epictetus, a poor man and once a slave, taught the Stoic philosophy in Epirus about A.D. 100 and wrote his *Discourses* and the *Enchiridion*, or *Handbook*, in Greek. His ideas are comparable with those of the Emperor Marcus Aurelius (*d.* A.D. 180), author of the famous *Meditations*. The

Stoic doctrine of the essential equality of all mankind is nicely illustrated by the way in which these two men of such diverse position in state and society found the same help and guidance in the austere tenets of Stoicism.

The chief exemplar of Stoicism, however, was Seneca, a Spaniard who spent most of his life in Rome and died there in A.D. 65. He became tutor of Nero, the brutal emperor who proved so unworthy of his master's efforts, although Seneca did exert some restraining influence upon him during the first years of his principate. Finally Seneca became involved in a plot against Nero, who ordered him to commit suicide, which he did in true Stoic fashion. If Seneca in his relations with Nero had to compromise himself, he governed his private life little better, avidly accumulating wealth in a manner quite unbecoming to the Stoic creed. His literary reputation rests on his tragedies, nine having been preserved, of which the *Medea* is the best known. They were imitations of Euripides's productions but possess less originality. Their influence, however, was very great upon Italian dramatic writers of the Renaissance and especially upon the French classical drama of the days of Louis XIV.

Seneca's philosophic writings are even more significant. They are the finest and fullest expression of Stoic philosophy developed among the Romans. The lofty ethics of Stoicism attracted Christian writers during the Middle Ages, for the moral maxims of Stoics sounded somewhat like Christian teaching. It was commonly believed that Seneca was a Christian and that he corresponded with St. Paul. Someone even forged letters that long were thought to have passed between the two. Seneca's was not an original mind; all his ideas were borrowed from the Greeks. His chief ethical writings are the essays *On Anger*, *On the Brevity of Life*, and *On Clemency*.

Juvenal and Martial. Satirical writing, which, as we have seen, reached high excellence in the *Satires* of Horace, developed an added pungency at the hands of Juvenal (*d.* about A.D. 135). Pillowed in luxury, the upper classes of Rome became more and more corrupt, more and more targets for attack. There are many stories of the moral degradation among the better classes during the close of the first and the early part of the second century A.D. Satire came naturally to the stern Roman, who disapproved of such evil living. But Juvenal seems excessively bitter, and we are inclined to reject some of his strictures as being too severe. His sixth satire, for example, has nothing good to say about women. It is hard for us to believe that all he tells of Roman depravity can be true. Such exaggerations, however, have received much attention from the moralists, who, dwelling at length upon the degeneracy of Roman society, have insisted that this was one of the main reasons for Rome's decline. The *Epigrams* of Martial (*d.* about A.D. 104) allude to the same corrupt conditions. Epigrams are pungent verses

that trenchantly describe an incident or a character, reserving the sting for the very end, a literary form especially adapted to satire. During the Renaissance in Italy, the practice of writing lampoons seems to have been inspired by Martial.

HISTORIANS. Among Roman historians, Julius Caesar (*d.* 44 B.C.) deservedly holds a high place. He was a busy soldier, active in the politics of the confused last years of the republic and constantly engaged in intrigue or fighting. His *On the Gallic War* in seven books deals with the conquest of Gaul, giving a comprehensive picture of that Celtic country, its culture, and its inhabitants. The story of Ariovistus, for example, shows a tribe on the march, searching for new homes and creating all sorts of problems for the people through whose lands they proposed to go.

Caesar had many enemies in Rome who disapproved his Gallic venture, and *On the Gallic War* was written in justification of his action. The language is terse and simple. Its impressiveness is heightened by the fact that Caesar always speaks in the third person—"Caesar marched . . . , Caesar attacked . . . , Caesar spoke. . . ." *On the Civil War* is a briefer treatise dealing with the later years of his life.

In grandeur of theme no Roman historian surpasses Livy (*d.* A.D. 17). His *History of Rome from the Founding of the City* in 142 books carries Rome's story down to A.D. 9. Although only a quarter of this vast compilation has survived, the remains are of the utmost importance, since they deal with some of the crucial moments of Roman history. Livy was an intense patriot; he wrote to glorify the republic and to extol the virtues of its great men. But he was uncritical, for he did not attempt to disentangle truth from legend and often accepted traditional stories when he could readily have learned the facts. In this respect he is inferior to his Greek predecessor Thucydides. His language is vigorous and his narrative, like the theme, elevated. In Livy's work as in that of Horace and Vergil there is a certain glorification of Rome, the Eternal City that charmed later writers such as St. Augustine of Hippo (*d.* A.D. 430) and Dante (*d.* A.D. 1321).

The writings of Tacitus (*d.* A.D. 117) continue the work of Livy. His *Annals* begin with the principate of Augustus, his *Histories* with that of Galba in A.D. 68. To them we owe much of our knowledge of the first century of the empire. He luridly describes the corruption of Roman society, especially the license and violence of Nero, but pays little attention to other features of the empire, which, as we know from other sources, were important. In general, Tacitus took pains to ascertain the truth. He stresses personalities often to such an extent as to make the course of events appear mainly dependent upon what great men thought and did.

His *Germany* is a description of the tribes of Germany, together with some account of their culture. It is a valuable book, for, although inadequate, it is our first picture of the people who were to overrun the empire three centuries later. *Agricola* is an account of the exploits of his father-in-law Agricola, the conqueror of Britain, and the first book to give us a full picture of that island. As a biography, it is one of the finest in ancient classical literature.

Another trait to be observed in Tacitus's works is his emphasis on morals. Like Juvenal and other satirists, he saw much to condemn in

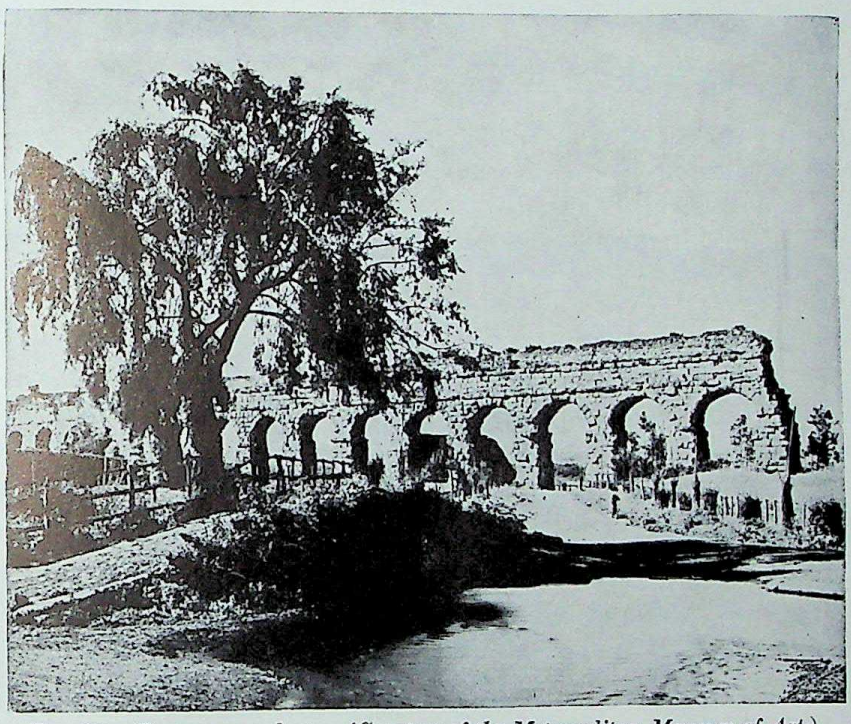


FIG. 38.—Roman aqueduct. (*Courtesy of the Metropolitan Museum of Art.*)

Roman society and felt so strongly on the subject that he used history to teach moral lessons. Thus the Germans were described as pure, courageous, and manly—a statement intended probably as an indirect criticism of Roman moral defects.

The last historian of the principate to be really influential was Suetonius (*d.* about A.D. 150). He served as a secretary under the Emperor Hadrian (A.D. 117–138) and so had an excellent opportunity to form a firsthand acquaintance with men and affairs. Collecting a vast number of anecdotes about the first emperors, he produced the *Lives of the Twelve Caesars*, from Julius Caesar to Domitian (*d.* A.D. 96). Filled with much intimate detail and gossip, Suetonius's little biographies have been

immensely popular. His most striking imitator was the monk Eginhard, who, in the ninth century, wrote the *Life of Charlemagne*, which in length, language, and personal anecdote closely resembles any one of Suetonius's *Lives*.

Such are the chief literary works of Rome. Their importance in the history of civilization is immense. They are the gateway through which much of the precious Greek spirit passed into medieval and modern

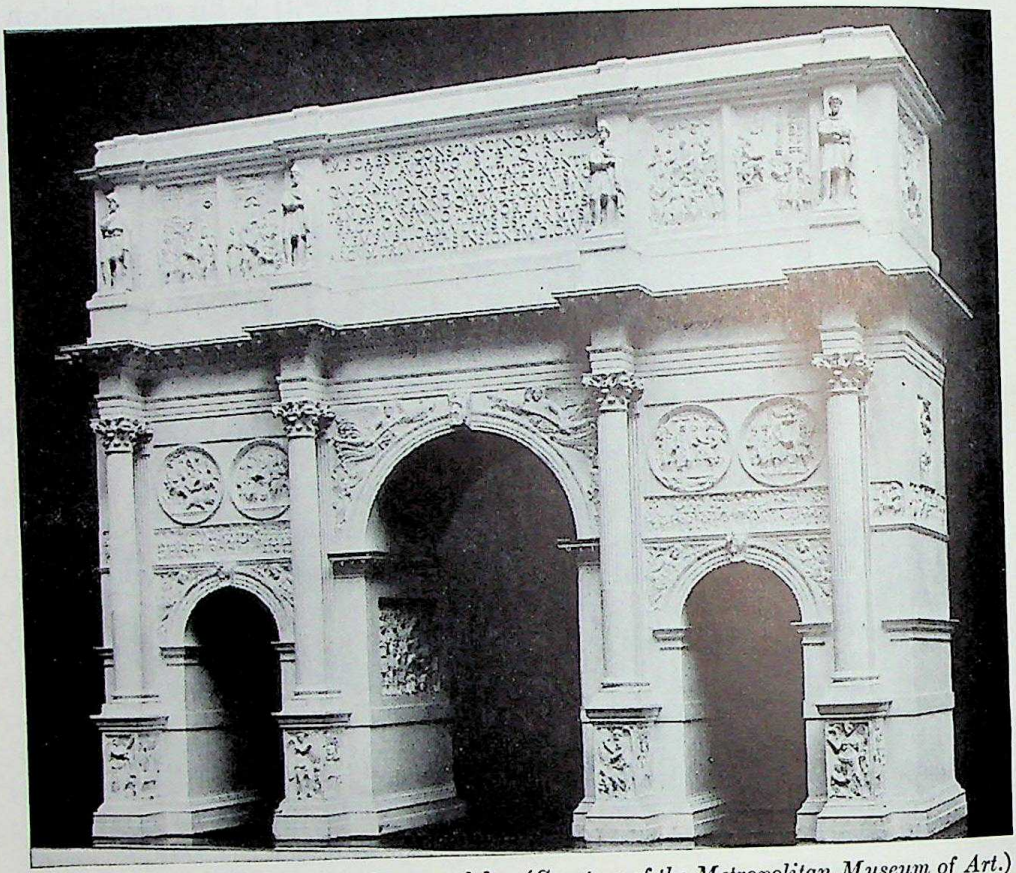


FIG. 39.—Arch of Constantine, from model. (*Courtesy of the Metropolitan Museum of Art.*)

times. They have great elegance and perfection of form, but they are generally less original than Greek and Hellenistic writings. Nevertheless, through this literature Rome appropriated Greek culture and became a center of its diffusion to many new peoples.

EDUCATION. Roman education, especially under the empire, owed much to Greek methods. Vocational training was restricted to handicraftsmen, many of whom were slaves and played no part in the political life of the city-state. In earlier days, boys were brought up in the strict ways of the Roman family. When the Greek city-states of Italy were conquered, Greek slaves began to instruct children in the homes. In

this way, Greek influence became more and more powerful. In Cicero's days, boys first learned reading, writing, and arithmetic. Then they were sent to a school where they studied Greek and Roman letters. Cicero was especially interested in a type of education that would properly prepare patricians for their responsibilities in the senate. They should study law, literature, rhetoric, history, and philosophy—not from textbooks, as often happens in our modern schools, but from the works of great writers such as Homer, Plato, and Thucydides. This kind of training was intended to make civilized men out of boys. The Romans called a man so trained *humanus*, or "human"; and from *humanitas*, the name of this form of culture, we derive the word "humanism."

Such also were the ideas of Quintilian (*d.* after A.D. 100). His *Institutes of Oratory* deals with the proper education of an orator or citizen; it exerted an immense influence on education. It is arranged in twelve books, the first discussing elementary education. It contains much sound advice as, for example, the precept "Before all things, let the talk of a child's nurses not be ungrammatical." On the other hand, Quintilian thought that memory was of chief importance in education, an idea that lasted through the Middle Ages and the Renaissance.

Architecture. In art, as in literature and education, the Romans borrowed heavily from Hellenistic models. The best known of Roman architects is Vitruvius Polio, who lived in the first century B.C. His *On Architecture* treats also of engineering problems. He and other architects used the ornate Corinthian order far more than did the Greeks, as it seemed to satisfy the Roman appetite for luxury. The combined form appears characteristically in the triumphal arch, erected to commemorate a great event or the reign of an emperor. Three such are still standing in Rome, each having three arches, the center one higher than the two outside. The surfaces are elaborately decorated with commemorative sculptured scenes in high relief.

Roman architects often placed columns of one order above those of another with more enthusiasm than good taste. This was done at Rome in the Flavian Amphitheater, better known as the Colosseum, a vast structure designed to seat at least fifty thousand spectators to view gladiatorial combats. The lowest story is formed of Doric columns one between every two arches, the second has Ionic columns, and the third has pilasters of the Corinthian order. The result is more ornate than beautiful and outrages the finer Greek standard of harmony; but it was impressive, and it satisfied the Roman love for display.

Roman public buildings speak eloquently of the teeming life for which they were constructed. One of the largest structures of ancient Rome, still preserved, is the Pantheon, built in the first century A.D. Its vast dome of concrete is 140 feet in diameter, with its highest point the

same distance from the floor. At the top of the dome is a circular opening 30 feet in diameter, the sole means of lighting the immense interior. The wall supporting this dome is a ring of concrete over twenty feet thick. The porch has sixteen Corinthian columns on which rests a pediment. This building "was the greatest achievement in ancient concrete construction; in 1,800 years it has required only a few minor repairs."

Many buildings scattered over Europe, northern Africa, and western Asia still bear mute testimony to Rome's greatness. The ruins of Timgad in Africa and Palmyra in Asia are extremely interesting. The city of Pompeii, covered by a rain of lava ash from erupting Vesuvius in A.D. 79,

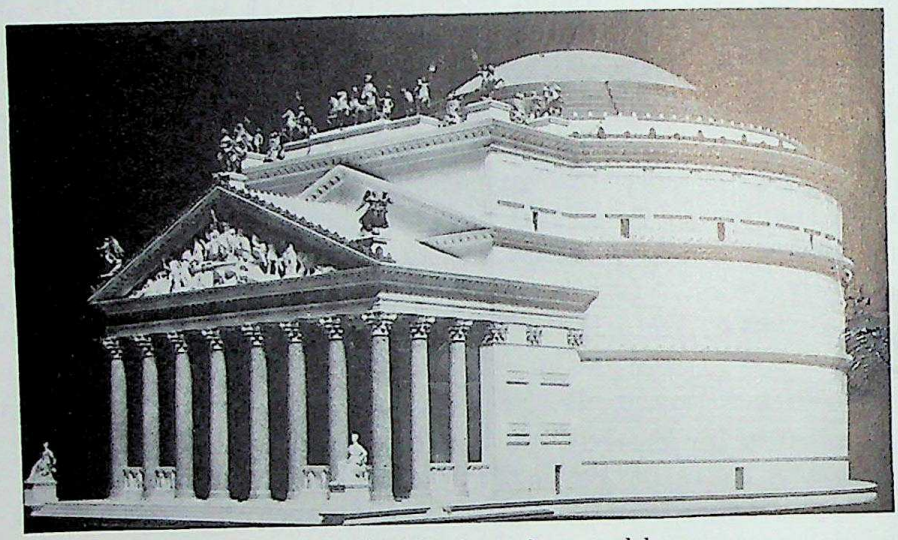


FIG. 40.—The Pantheon, from model.

has in recent times gradually been excavated. Its walls, gates, waterworks, streets, houses, tombs, market place, temples, theater, fountains, ovens, mills, furniture, and wall paintings vividly recall the bustling life of the first century A.D.

ENGINEERING. The Romans did not hesitate to build high-span bridges, the one over the Tagus River in Alcántara in Spain having a height of 150 feet. Aqueducts were regarded as a necessity, and some of them still march across the ancient Roman countryside. The one at Nîmes in southern France was formed by three arcades superimposed to carry the current of water at a height of 160 feet.

It is evident that the Romans were excellent engineers. They took over the methods of construction employed by Hellenistic engineers but often surpassed them in the magnitude of their creations. Especially impressive are the Roman methods of building roads, remains of which may still be seen on the Appian Way and the Sacred Way in Rome.

Roman roads were usually the shortest route between important economic and military points. Several layers of stone and concrete were prepared and surfaced with stones so carefully hewn and fitted that water could scarcely trickle between them. Wagons passing over them would not rattle. Some of these roads with the original surface rocks still intact are used even today.

SCULPTURE. During the early days of Rome there was little appreciation of sculpture, but after the sack of Corinth in 146 B.C. many statues were carried back to Rome to decorate the city. Soon it became fashionable to own Greek statues, and a flourishing business of copying masterpieces sprang up in Athens. Large numbers of such copies have been

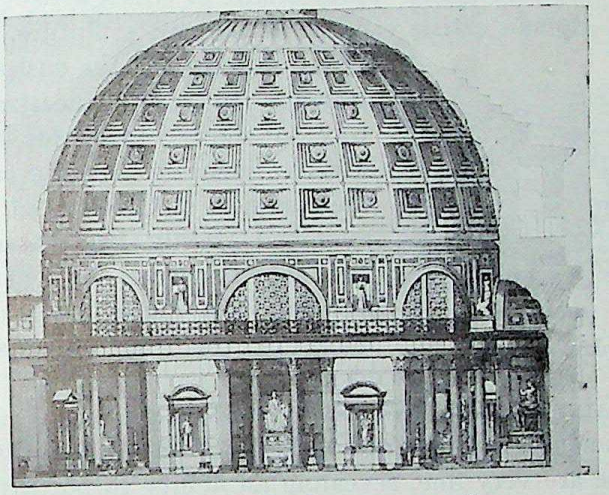


FIG. 41.—The Pantheon, cross section.

preserved, among them the "Venus de' Medici," "Laocoön," "Apollo Slaying a Lizard," "Apollo Belvedere," "Boy and Goose," head of Homer, and head of Zeus. These statues are significant even if they are but copies of the masters' works, for they reflect the artistic ideals of the Hellenistic Age. It was these copies which inspired and instructed the great artists of the Renaissance.

Copying Greek statues and imitating Greek taste, however, did not produce the highest sculptural art. It seems that the Romans were not able to grasp the refined subtleties of the Greek masters. Artists who possessed questionable taste or imperfect knowledge received many commissions; when the Romans tried to copy Greek sculptors, the results were mediocre. An example of this is the extant carving on the Ara Pacis, or Peace Altar, set up in the forum during the principate of Augustus to commemorate the establishment of universal peace. One of its panels is an allegory known as the Tellus Group, in which Tellus, or

Earth, a goddess, is seated holding two nude babes. A cornucopia of fruit and flowers is also upon her lap. At her feet are a cow and a sheep. On her left is Water, a male figure in front of whom water is gushing forth from the ground. On her right is a female figure, representing Air, who is seated on a flying swan. Air, riding backward on a swan too small to carry her, is out of harmony with the stationary figures of Earth and Water. Another disagreeable feature is the drapery over the bosom of Earth, which hangs unnaturally from her breast. The figures, undeniably pleasing in themselves, are marred by inexact details and spoiled by a lack of group harmony.

Such realists were the Romans that they never completely sensed or mastered the idealization so characteristic of Greek artists. Because of this realism, Roman artists excelled in portrait sculpture. From early times, it had been the custom among the Romans to make ancestral masks of wax to show respect for their fathers. Marble likenesses became common after the conquest of Greece, but the portraits remained sternly true to nature. This fortunate reverence for their forefathers has left us a fine collection of busts of many of the great figures of Roman history.

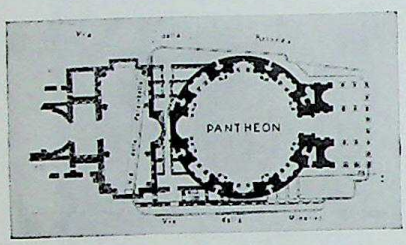


FIG. 42.—The Pantheon, ground plan.

ROMAN PAINTINGS AND MOSAICS. Painting attained great excellence, but almost the only surviving examples are those on the walls of Pompeii. Some of these are very fine, revealing an ability to portray the human body gracefully in all its difficult positions. Perspective was understood and applied in painting large groups and scenes from nature, which look much like the fresco paintings of the Middle Ages. Another well-advanced form of the pictorial art was mosaics, composed of carefully cut bits of colored glass, marble, or stone. Artists produced spirited scenes in mosaic for the walls of public and private buildings. Floors were decorated with them, a combination of geometrical patterns and marine or rural scenes being most popular.

Rome's contribution to civilization consists first of all in appropriating the culture of the Greeks and spreading its elements far and wide to peoples who had never experienced direct contact with it. Henceforth the most diverse peoples—Egyptians, Britons, Gauls, Germans, and Iberians—received a more or less uniform cultural imprint. The inspiration of Greek genius is obvious in Roman literature, philosophy, and artistic achievement. It will be observable likewise in the development of science and learning, described in the following chapter.

FOR FURTHER READING

BAILEY, CYRIL (ed.): *The Legacy of Rome*
———: *The Mind of Rome*
CARRINGTON, R. C.: *Pompeii*
CARY, MAX: *A History of Rome down to the Reign of Constantine*
CHAPOT, VICTOR: *The Roman World*
COUCH, H. H., and R. M. GEER: *Classical Civilization.* II. *Rome*
DILL, SIR SAMUEL: *Roman Society from Nero to Marcus Aurelius*
———: *Roman Society in the Last Century of the Western Empire*
DUFF, J. W.: *The Writers of Rome*
GWYNN, AUBREY: *Roman Education from Cicero to Quintilian*
MOORE, F. G.: *The Roman's World*
NILSSON, M. P.: *Imperial Rome*
ROSTOVTZEFF, M. I.: *A History of the Ancient World.* Vol. II
———: *The Social and Economic History of the Roman Empire*
STOBART, J. C.: *The Grandeur That Was Rome*
TOUTAIN, JULES: *The Economic Life of the Ancient World*
WALTERS, H. B.: *The Art of the Romans*

Chapter XIV

GRECO-ROMAN SCIENCE AND LEARNING. ROMAN LAW

It is a commonplace but an incontestable truth that Rome, in order to achieve its intellectual and moral education, had to go to school in Greece.—Maurice Croiset

INSPIRED by the brilliant originality of Greek achievement, the Romans produced literature, architecture, painting, sculpture, and philosophical works in imitation of Greek models. But their creative activity weakened after the close of the first century A.D. One possible explanation is that the Romans, not keenly intellectual like the Greeks, remained somewhat provincial in outlook. They adopted a shortsighted attitude toward theoretical science, refusing to look beyond the immediate practicalities. Furthermore, the Greek creative energy itself declined; after A.D. 100, progress was slight in centers like Alexandria, Athens, and Pergamum. True science was neglected for the false; alchemy and astrology became more and more widely studied. Medical practice became traditional and stereotyped, and a general mediocrity marked the steady decline of Greco-Roman culture.

Roman Science: Frontinus and Pliny. There are few exceptions to the foregoing generalizations. Frontinus, who lived in the first century A.D., wrote a scientific treatise, *On Aqueducts*, which reveals extensive knowledge of geometry and a basic understanding of scientific ideas as well as their practical application. Although this book surpasses in genuine scientific worth the *Natural History* of Pliny the Elder (*d.* A.D. 79), it never became so famous.

A kind of encyclopedia embracing all the sciences as well as gardening, medicine, and the fine arts, the *Natural History* falls far short of what we today regard as a true work of science, for it is inferior to the scientific productions of Galen and Ptolemy, who lived a century later. Though Pliny was interested in natural phenomena, few of the data recorded in the *Natural History* came from personal observation or were sifted critically. He ranged over the whole subject of science, read two thousand books, and treated as many as twenty thousand topics. He was uncritical and gullible, repeating the errors of former scientists and philosophers; but the practical Romans liked his encyclopedia, for here in a small compass one might read all that was known about nature.

Such an attitude was a seriously mistaken one, for science rests upon the direct study of nature. The person who today relies upon an encyclopedia like Pliny's *Natural History* forfeits the right to be called a scientist. An age that puts its scientific trust in such collections, regarding them as authoritative as did the Middle Ages and so neglecting the firsthand study of nature, seriously limits itself. For many centuries after Pliny, men

FIG. 43.—The Emperor Hadrian, bronze head.

made excerpts from the *Natural History* and regarded these gleanings as a sufficient basis for the practice of medicine. But even if Pliny was not a great scientific investigator, his work was of the utmost importance in the history of civilization. He collected a vast amount of information upon many aspects of private life and all sorts of classical lore. This would have been lost had not the indefatigable Pliny made his encyclopedia.

Greek Scholarship: Strabo and Ptolemy. Although Roman scientific ability seemed exhausted by the end of the first century A.D., Greek scholarship still showed considerable energy. Strabo, a wandering Greek scholar, arrived in Rome in 29 B.C., where he wrote a *Geography* in seventeen books, a work that has made him famous. Because he had traveled widely, read diligently, and collected information from other travelers, his *Geography* contained the fullest description of the world

Fig. 44.—Roman wax tablet with stylus, from models. (*Courtesy of The New York Times.*)

possible in the days of Christ. He began his work with the provinces in the West, proceeded eastward among strange peoples, and even recorded what little had been learned about India and China since the days of Alexander the Great. No one in the classical world had ever attempted a geographical description on so vast a scale. Although critical ability was not Strabo's chief virtue, his *Geography* was a most influential compendium, giving a remarkably complete picture of the ancient world.

The work of Ptolemy (Claudius Ptolemaeus), who studied at Alexandria during the second century A.D., is also important. He not only

summed up Greek scholarship in astronomy but determined the thought of future generations on mathematics, geography, and astronomy. His great treatise, an encyclopedia in thirteen books, was called the *Megale Syntaxis*, or *Great Synthesis*. Arab scholars later corrupted these words, and by prefixing *al*, their word for "the," produced the name *almagest*, by which Ptolemy's work was known to later ages.

Ptolemy's Ideas of the Universe. Like Aristotle, Ptolemy accepted the theory of a "geocentric" rather than a "heliocentric" universe. He assumed that the seven bodies or planets—moon, Mercury, Venus, sun, Mars, Jupiter, and Saturn—move around the static rotund earth. But this homocentric theory could not explain why these bodies

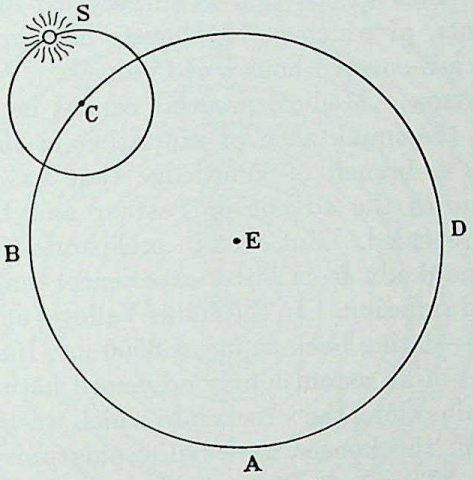


Fig. 45.—Illustration of epicycles.

"wandered," now nearer, now farther away. Ptolemy proposed a theory to explain this phenomenon. He suggested, as had some earlier astronomers, that such planets might be moving in epicyclical paths. Thus the sun, in the accompanying figure, travels along a circular tract, the center C of which moves uniformly at the same time along the circumference of circle $ABCD$ with center E. When this speculation failed to allow for the great divergences in the paths of the "wanderers" of planets, Ptolemy proposed the theory of "eccentric" circular paths, suggesting that planets traveled along the path of off-center circles, which might explain why at times they appeared nearer than at other times. Curiously, it never occurred to him or any of his followers for over a thousand years to calculate planetary movements on the basis of an elliptical tract. This, the correct solution, was first offered by Johannes Kepler (*d.* 1630).

Roman Medicine. The Romans added little to the theory of medicine. Before they came into contact with the Greeks, medical methods were primitive. Magic was common, herbs were employed, and a

multitude of gods, each presiding over a special bodily function, were appealed to. So firmly were these ancient practices entrenched that Greek scientific ideas could find no universal acceptance.

During the days of the empire when Rome was the largest city in the world, all kinds of people congregated within its walls and all manner of superstitions throve. Quacks of every description exploited those suffering from diseases of the eye and sold fraudulent nostrums at a high figure. On the other hand, the practical Romans made some noteworthy contributions to surgery; and progress was made in plastic surgery and in operations for hernia, cataract, and version of the uterus. The Caesarean operation seems to have first made its appearance in Rome with the birth of Julius Caesar. This special skill in surgery led to the perfection of surgical instruments, of which archaeologists have recovered over two hundred from the ash-covered houses of Pompeii.

Early Sanitation. Medical progress cannot be discussed without some thought on the importance of sanitation in the development of civilization. It is a branch of knowledge that has curiously lagged, awaiting for centuries the advent of Pasteur and Lister for its true significance to be revealed. But even in prehistoric times our predecessors had learned, no doubt from bitter experience, that certain practices obviate disease and suffering. In the Indus Valley—at least in Mohenjo-daro and Harappa—dating back as far as 3000 B.C. the people possessed hygienic appliances of an astonishingly advanced nature. In Mohenjo-daro there were drains along the streets into which waste and sewage were discharged. Within the houses were bathrooms provided with water-proof brick floors. There were also latrines, and a carefully devised system of earthen drain pipes, joined together by neatly fitting sockets, which carried water and sewage into the drains outside.

The cities of Sumer and Babylon appear also to have been provided with advanced hygienic devices. In Egypt in the city of Akhetaton, built by Akhenaten of the Eighteenth Dynasty, houses of the better classes were provided with bathrooms, stone drains, brazier stands, and other stands holding jars containing water for drinking and washing. City sanitation was also highly developed in Crete (about 2000 B.C.), where large pits lined with stone were constructed, into which sewage was drained. Archaeologists have found that Cretan palaces were provided with excellent systems of conveying water through terra-cotta pipes provided with closely fitting joints. Hellenistic cities were also progressive in respect to sanitation, and from them the Romans learned much. But the genius of Roman engineers soon produced greater triumphs than any hitherto achieved.

Sanitation and Hospitals in Rome. Roman methods of distributing water are revealed by the remains at Pompeii excavated by

archaeologists. It appears that each house was provided with water from a central distributing system. In Rome, every house had its own cistern, taps, and service pipes of lead or terra cotta. Great sewers were constructed, the best known being the Cloaca Maxima, which drained the whole area of the forum and adjoining parts. It received surface water as well as sewage, which it discharged into the Tiber. The Cloaca Maxima was so well built of vaulted stone that even today it continues to serve the needs of the city.

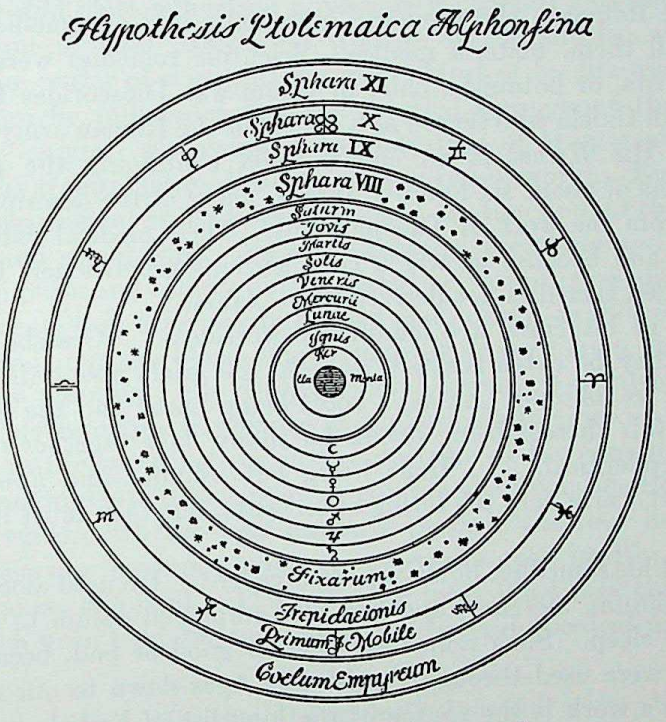


FIG. 46.—The universe according to Ptolemy.

Similar well-planned drainage systems were constructed in provincial cities. Latrines flushed by water, storage tanks for the collection of sewage, and the sanitary treatment of sewage existed everywhere. Some latrines that served as public lavatories may still be seen even in provincial cities, as at Timgad in northern Africa, exactly as they appeared more than fifteen hundred years ago. To provide cities with vast quantities of water for such systems and for the great baths, engineers constructed aqueducts on the most scientific principles.

The Romans were the first to develop an extensive system of hospitals and hospital organization. They, of course, learned much from Greek temples of healing, especially those at Cos and Epidaurus. But the

medical needs of the Roman army, whose duty was to keep watch and ward along the borders of the empire, demanded the best scientific methods of caring for sick soldiers. Large hospitals were constructed, some of which have been excavated. The one at Neuss on the Rhine, for example, was provided with vestibules, administration rooms, apothecary's shops, and forty wards arranged along corridors. The hospital system thus developed was later used in the Byzantine Empire, the Arabian East, and in medieval Europe.

Dioscorides the Herbalist. Healing especially appealed to the pragmatic Romans, who produced systematic lists of remedies or, as we should call them, materia medica. Scientific remedies were suggested by herbalists, or botanists, chief of whom was Dioscorides Pedanius, a Greek from Cilicia who served as a doctor in the Roman army of the first century. His *Herbal* is an encyclopedia containing the names and descriptions of about six hundred plants, many of the descriptions being derived from the work of Theophrastus. Their medical value is given in detail; and because he was a conscientious practitioner, Dioscorides also included remedies not derived from plants.

Many of his cures are manifestly worthless. "Grasshoppers," he said, "if they be eaten roasted, do help the griefs about the bladder." Others are as follows: "An ass's hoofs being burnt and the quantity of two spoonfuls thereof being drunk for many days together are said to cure the epileptical. . . . Hens being cut asunder and applied while they are yet warm help the biting of serpents, but they must be changed often."

Some of his remedies, however, are excellent. He used aloes, aconite, squills, aspidium, mercury, and iron and employed opium to allay pain and induce sleep. Such remedies, whether good or bad, became traditional and were used through the Middle Ages down to our own time. Dioscorides's work is the source of the long list of herbals in medieval Latin and modern languages, the forerunners of our pharmacopoeias.

Celsus. The most significant name in Roman medical history is that of Celsus, who lived at the time of the emperors Augustus and Tiberius. Although not a physician, he possessed a remarkable insight into scientific lore. His classic volume (about A.D. 30) *On Medicine* deals with medical science as it existed in his day but in addition discusses the achievements of earlier physicians from the days of Hippocrates, setting an example for histories of medical practice.

Celsus made accurate diagnoses of meningitis and appendicitis, describing the latter as a "distemper seated in the large intestine principally affecting that part where . . . the caecum [is] . . . , accompanied by violent inflammation and vehement pains, particularly on the right side." He is the first writer to describe how bleeding may be stopped by

means of ligature. After every effort has been made to check it, the physician is advised to "grasp the vessel from which the blood is flowing, ligate it above and below the wounded part, and then sever the vessel between the two ligatures."

On Medicine is a remarkable outline of medical science and practice. Though it exerted little influence during the Middle Ages as compared with the work of Galen, it became immensely important during the Renaissance.

Galenic Medicine. After Hippocrates, Galen (A.D. 129–199) was the greatest and most influential physician of classical antiquity. Born in Pergamum in Asia Minor, he studied in Alexandria, which still remained the center of scientific activity. Most of his life was spent in Rome, where he influenced medical practice throughout the western part of the empire. Following in the footsteps of Hippocrates, Galen mastered the traditional medical lore of the Greek world. But he went on to perform original experiments to explain the functions of the kidneys, cerebrum, and spinal cord. He also explained breathing and the character of the pulse and clearly differentiated between nerves and muscles. To demonstrate that arteries carry blood and not air, he showed that if a small artery is cut the blood supply may be drained from the body in about thirty minutes. His descriptions of fevers are particularly good in spite of his unfortunate reliance on philosophic theories.

Galen continued to believe in the doctrine of the four humors and the four qualities—that the body is composed of combinations of four elements, which with the four qualities produce the four humors. So long as these are in proper balance, one enjoys good health; if they are not in balance, one is ill. The following table illustrates these conceptions, which until modern times remained basic in medical practice:

Qualities	Elements	Humors
Hot and wet	Air	Yellow bile
Hot and dry	Fire	Blood
Cold and dry	Earth	Black bile
Cold and wet	Water	Phlegm

Galen wrote over one hundred and fifty books covering the entire subject of medicine as it was then practiced. But this enormous literary activity argues greater industry at copying than fresh observation, for the books show an unfortunate tendency to rely on the authority of former masters. However, we must remember that the practice of medicine had long been declining. The old vigor in research was fast vanishing, dissection of human bodies was no longer practiced, and

physicians had to rely upon their studies of animals for anatomical and physiological knowledge. Galen could not surmount this condition. It is easy to criticize the imperfect knowledge and practice of former masters in the light of the improved methods of the past century. But for good or ill Galen produced an encyclopedic synthesis of Greek medical practice just when men were giving up rigorous scientific learning. Succeeding ages regarded his works as infallible authorities on all medical matters; thus, whatever was good or bad in medieval medicine is due to a considerable extent to Galen.

Alchemy and Astrology. With the passing of Ptolemy and Galen the creative scientific activity of the ancient world came to an end. Medical knowledge steadily shrank, the study of human anatomy declined, and physiology suffered in consequence. It was the same in other branches of intellectual activity. The basic study of the problems of nature disappeared, scientific books were no longer used, and the vast bulk of the Alexandrian library disappeared by the time of Ptolemy. Men no longer cared to make painstaking studies of nature; science became traditional, stagnant.

Because it was no longer possible to distinguish erroneous from correct ideas, men began to dabble in magic, alchemy, and astrology. Alchemy, in particular, flourished mightily. It grew up in Egypt and appears to have owed its inspiration to the dyeing industry, the manufacturing of imitation pearls, and the working of costly metals. Greek philosophy contributed much to the development of alchemy. Plato taught that matter is merely the absence of "Ideas," which have their origin in a world beyond man's knowledge. It is not matter that counts, but the Ideas that are associated with it. A good man and a bad are materially the same; what makes them different is the soul. If this was true, why could not the "qualities" of some base metals be changed and so produce metals of nobler quality? The scientists of Alexandria believed that color is the chief quality of metals. They experimented to discover ways of changing the color of copper into the color of gold and so transforming copper into gold. Copper, iron, tin, and lead were smelted together. This common matter, to whiten it, next was treated so as to change its quality by the addition of quicksilver. To the white alloy resulting from this process was added a trifle of gold and some calcium sulphide. The resulting mixture was believed to be gold simply because it had become yellow.

So long as such experiments continued along scientific lines, they were innocent. With the decline of science under the late Roman Empire, however, alchemy became related to magic and even to astrology and so continued into the Middle Ages, finally to be conquered by chemistry.

Another so-called science associated with the decline of true scientific activity was astrology. Astrology has a complicated origin that goes back to Egypt and Babylonia, whence it passed to other parts of the ancient world. It appeared in the Roman Republic about the beginning of the first century B.C. and finally became an honored science along with magic and alchemy, influencing them and influenced by them.

THE ZODIAC. Astrologers developed the idea of the zodiac, a broad circular band about eighteen degrees wide extending across the sky from east to west, dividing it into twelve sections, or "houses," to each of which is assigned a constellation. Revolving faster around the earth than the sun, the zodiacal band gains about one degree each day. Hence, the sun is said to enter Aries on Mar. 21, Taurus on Apr. 20, and the Gemini on May 20. Figure 47 gives the twelve constellations, the day on which the sun enters each, and the signs commonly employed.

Many Greek philosophers agreed with the Babylonian teaching that the heavens influence all things on this earth, including the life of man. They even gave scientific support to astrological speculation. Thus Aristotle taught that the "prime mover" beyond the universe sets in motion the outer planet with its surrounding air, which sets in motion the planet next to it, and so forth, until the moon, the planet nearest the earth, is put in motion. From these teachings, astrologers of the late Roman Empire developed the doctrine that stellar movements control man's affairs. Such regular changes as day and night, the succession of the seasons, and the growth and decay that accompany the seasons were held to be caused by the regular rotation of stars. The seemingly unpredictable events in life are due to the "wandering" of the planets. It became common to cast horoscopes, to ascertain the aspect of the heavens at the moment of birth in order to predict a person's future. Public men and generals often consulted astrologers, a practice continued even in modern times. Von Wallenstein, for example, sought their help to win his campaigns in the Thirty Years' War (1618–1648). Napoleon believed he was fighting "under his star." We still use such words as mercurial, from Mercury; lunatic, from Luna, the moon; jovial, from Jove, or Jupiter; venereal, from Venus; saturnine, from Saturn; martial, from Mars; and solar as in solar plexus, from Sol, or sun. "Consider" means "to study the stars," and "disastrous" means "pertaining to an evil star." We still talk about the "ascendancy of genius." The German *mondsüchtig* is the same as our "moonstruck." The French *malheur*, or misfortune, means "evil hour." A vast number of additional examples may be found in these and other modern languages.

Astrology became important in medicine, especially after anatomy and physiology were no longer emphasized. And why should it not usurp their place, if the dogma of the influence of the stars were true?

Medicine tended to become a branch of astrology. The signs of the zodiac exerted influences on the body—Aries on the head, Taurus on the

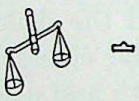
Number	Name of constellation	Signs	Sun enters
I	Aries, ram	♈	Mar. 21 (spring equinox)
II	Taurus, bull	♉	Apr. 20
III	Gemini, twins	♊	May 20
IV	Cancer, crab	♋	June 21 (summer solstice)
V	Leo, lion	♌	July 22
VI	Virgo, virgin	♍	Aug. 22
VII	Libra, balance	 ♎	Sept. 21 (fall equinox)
VIII	Scorpio, scorpion	♏	Oct. 23
IX	Sagittarius, bowman	♐	Nov. 23
X	Capricornus, goat	♑	Dec. 21 (winter solstice)
XI	Aquarius, waterman	♒	Jan. 20
XII	Pisces, fishes	♓	Feb. 19

FIG. 47.—The Zodiac.

neck, Gemini on the shoulders and arms, Cancer on the breast, Leo on the flanks, Virgo on the bladder, Libra on the buttocks, Scorpio on the

genitals, Sagittarius on the thighs, Capricornus on the knees, Aquarius on the limbs, and Pisces on the feet. These were significant influences in determining bodily vigor.

We have seen that the four elements were combined with four qualities, thereby producing the four humors. The four seasons were also involved in astrological medicine—spring with the qualities hot and wet, influencing yellow bile; summer with the qualities warm and dry, influencing the blood; fall with the qualities dry and cold, influencing the black bile; and winter with the qualities cold and wet, influencing the phlegm. When these humors were out of balance, owing in part to the changing seasons, illness resulted. In order to restore the proper balance, bleeding was practiced and tonics were given. Some of this lore is still popular; it provides the basis for patent medicines and all sorts of quack practices.

Such was the state of scientific knowledge and medical practice before the close of classical antiquity; such the ideas that passed into the lore of the Middle Ages. Magic is very old and, although it has never had any legitimate claim to be considered a science, has continued as a conscious or unconscious force throughout history. Alchemy and astrology possess some scientific basis, and alert inquiry should have enabled alchemists and astrologists to rectify their mistakes. But late Greek scientists respected authority too much; their medieval successors imitated them and even failed to continue some of the better ideas and practices of ancient scientists.

Neoplatonism. Neoplatonism, the last intellectual triumph of the Greek philosophical spirit, is a system that in its influence rivaled the scientific work of Galen and Ptolemy. It was taught by Plotinus of Egypt, whose works, the *Enneads*, or *Nine Parts*, were published by Porphyry (*d.* 304). Neoplatonism closely resembles Platonism. We must think of two poles, the "One," or God, and the extreme opposite, matter. Between these two poles are all things. These things result from a series of emanations from the One. The One is infinite perfection —so perfect that it is superior to anything mortals can think about it. It radiates some of its divine qualities, the first emanation being the Divine Mind, the sum of divine Ideas. Moving toward the opposite pole of matter is the next emanation, the World Soul, the image of the Divine Mind. The next emanation constitutes the particular beings whose intelligence, soul, and body are regarded as three stages of being.

Such being the constitution of things, what is man to do with himself? His soul is immaterial—originally it comes from God—but he is caught in a material world. Vanity, base appetities, passions, egoism, sex, the desire for food, clothing, and wealth ever draw him downward. To return to God is his true purpose. Man must therefore turn his back

upon the world, deny it, and direct his face to God. When viewed in their ultimate relationship, all things really are One. Man can contemplate the One, or God, and God will shed a special light upon the soul seeking Him. Man is homesick for God, is overwhelmed by love for Him. This is the "illumination." When the soul sees the glorious light of the One, it is caught in ecstasy. Finally, it may even be reunited with the One, and this is man's highest happiness.

Of all ancient philosophies Neoplatonism has the most completely developed doctrine of mysticism. It exerted an enormous influence on subsequent thinking, deepening and coloring the inner life of future generations. It was the cause of much asceticism, that is, the doctrine that salvation is to be gained by mortification of the flesh. Out of it, in part at least, came such ideas as the mystic vision, the ladder of perfection, and other practical devices to inculcate devotion so commonly employed in the Middle Ages.

PLUTARCH'S PARALLEL LIVES AND LUCIAN'S DIALOGUES OF THE DEAD. Late Greek Literature was not nearly so important for succeeding ages as was the science of Galen and Ptolemy. Nevertheless, a number of significant writers appeared. Most famous of these is Plutarch (*d.* about A.D. 120), author of the *Parallel Lives*. This is a collection of biographies of twenty-three Greek and twenty-three Roman notables, the essential characteristics of each being deftly drawn. Even though Plutarch was not an impeccable historian, his sketches are so good that anyone who wishes to familiarize himself with the outstanding features of Greek and Roman life can do no better than to read this work. Another writer of the second century A.D. is Lucian of Samosata, the author of the satirical *Dialogues of the Dead*, in which he attacked religion and mythology and every aspect of life. His *Alexander the False Prophet* is a merciless exposure of a renowned religious quack. A good idea of Lucian's influence may be formed from reading Erasmus's *Julius Exclusus*, or *Julius Shut Out of Heaven*. Voltaire and Swift, who also thought and wrote like Lucian, may be regarded as disciples of this master of satire.

ROMAN LAW. The law of the Roman Empire, like its science and medical practice, derived from the Greeks, also continued into the Middle Ages, and is still widely employed. It is remarkable that Roman law, formed to take care of the business and other practical activities of Roman life, continued to function long after the Roman Empire ceased to exist. Evidently legal ideas once thoroughly established are hard to eradicate, as is proved by the fact the Roman code forms the basis of much modern European law. It also supplied many a principle in the canon law of the Christian church and fostered such interesting doctrines about politics as the idea that the will of a prince should be law—a teaching most important in the Middle Ages, when people struggled against

feudal anarchy. And, with equal facility, the ancient Roman dictum that whatever concerns all should be referred to all for ratification was used when men wanted to check absolutism and establish democracy.

Roman law dates back to the peasant days of Latium. Fitted to the life of a small and backward rural community, it was extremely conservative. So long as law was a set of customs preserved only in the memory of the landholders and interpreted only by the elders, decisions could not be favorable to merchants and poor folk. Consequently, the writing down of the law in the famous Twelve Tables about 450 B.C. was a momentous step. Now at least all men might know just what the law said.

As business grew, other changes were necessary, especially after Rome had become a conquering state. There was the problem of aliens, in the city without legal rights, who might be arrested and their property seized. Cases arising from the troubles of such people with Roman citizens were left to a special judge, the *praetor peregrinus*, appointed for the first time in 242 B.C. Because the Twelve Tables constituted the civil law applicable to Roman citizens only, the *praetor peregrinus*, in judging the rights of aliens, often studied the law under which aliens lived at home. This was natural, for in earlier times it was usual to think that people carried with them their own law and custom wherever they went, a personal conception of law, opposed to the modern territorial idea, which holds that a stranger is judged by the law of the country in which he happens to be.

Quite naturally, therefore, the *praetor peregrinus* developed a body of law and a set of practices that were drawn from the customs of many foreign places. This was called the *jus gentium*, or the "law of the peoples." Often the praetor borrowed philosophic ideas to clarify difficult cases. The Stoic doctrine that by "nature" all men are equal was a fine principle on which to base the *jus gentium*. This was an extremely important doctrine because it helped to make a universal Roman law of the narrowly provincial law of Latium, humanizing it and making it applicable to all peoples.

Codification by Justinian. For a long time, Roman law remained unwritten and unclassified, and the praetors often had to draw up sets of rules for their own use. However, there were law schools in Rome where scholars like Papinian (about A.D. 200) wrote on the law, gradually developing a science of jurisprudence. Theodosius II in A.D. 438 codified the laws of former Christian emperors. But the great work of codification was reserved for Justinian I, Byzantine emperor from A.D. 527 to 565, who set down in logical form the whole body of Roman legal principle, preserving it for the instruction of future generations. The immense task of sifting, arranging, and clearly stating the laws and

rejecting obsolete ones was carried out by a committee under the celebrated jurist Tribonian. Their work came to be called the *Corpus Juris Civilis*, or "body of civil law." It consisted of the following parts: (1) the *Code*, or *Codex*, containing laws and decrees; (2) the *Pandects*, or *Digest*, giving summaries of laws; (3) the *Institutes*, a textbook of Roman law; and (4) the *Novels*, or new laws issued by Justinian after the second revision of the Code. This logical and coherent body of legal principles clearly regulating the relations of man with man is of the utmost importance in the history of civilization.

Such were the chief intellectual contributions of late Greco-Roman civilization. The codification of Roman law undoubtedly was of more lasting significance than Galenic medicine, Ptolemaic science, astrology, and alchemy, all of which long flourished but which today have become antiquated. Neoplatonism still possesses vitality, as may be observed in modern philosophy. When the Greco-Roman Period drew to a close, its science and law were bequeathed to the Arabians and to the incoming German barbarians of the north. But before we turn our attention to the fate of late classical culture, we must sketch the rise of Christianity, which was to prove most important in forming the civilization of medieval and modern times.

FOR FURTHER READING

Bailey, Cyril (ed.): *The Legacy of Rome*
Carrington, R. C.: *Pompeii*
Castiglioni, Arturo: *A History of Medicine*
Cumong, Franz: *Astrology and Religion among the Greeks and Romans*
Declareuil, Joseph: *Rome the Law-giver*
Dill, Samuel: *Roman Society from Nero to Marcus Aurelius*
Hopkins, A. J.: "*A Modern Theory of Alchemy*," *Isis*, Vol. VII, pp. 58–76
Riesman, David: *The Story of Medicine in the Middle Ages*
Robinson, V.: *Pathfinders in Medicine*
Rostovtzeff, M. I.: *A History of the Ancient World*, Vol. II
Sigerist, Henry: *The Great Doctors*
Singer, C. J.: *From Magic to Science*
Stubbs, S. G. B., and E. W. Bligh: *Sixty Centuries of Health and Physick*
Thorndike, Lynn: *The Place of Magic in the Intellectual History of Europe*
Vinogradoff, Paul: *Roman Law in Mediaeval Europe*

Chapter XV

RISE OF CHRISTIANITY

Culture must have its ultimate aim in the metaphysical or it will cease to be culture.—Jan Huizinga

IT NOW becomes our task to describe a major event in the history of Western civilization—the appearance of Christianity and its establishment as the religion of the Roman Empire. We sometimes hear that religious and philosophical questions are of little importance compared with political, social, and economic forces. Although it is not the historian's duty to prove religious or philosophic propositions, it is his task to tell how people have developed their culture under the influence of religious and philosophic ideas. The significance of religion lies in the fact that it presents a special set of ideas, or dogmas, which are accepted as true. These ideas give purpose to all that men do, give them a reason for toiling and suffering or struggling for principle, for doing good rather than evil. Belief in a supreme being provides a basis for human action, transforming it, and thus altering culture and creating civilization. Hence, there is a Christian society, a Christian art, a Christian literature, a Christian ethics, and a Christian philosophy and theology. A similar line of reasoning may be applied to such other religions as Buddhism, Confucianism, and Mohammedanism.

Existing Religious Cults. A serious religious crisis arose in the Greek and Roman world. Each city-state had its special gods and local cults closely bound up with its life. But the great gods of the Greeks and the Romans had lost their prestige because of the skepticism of philosophers like Epicurus and Lucretius. Besides this disbelief, which undermined the old religion among educated classes, there came a political crisis that put an end to the independent existence of city-states. Absorbed into the Roman Empire, they became dependent municipalities, regulating only their internal concerns. Local worship, hitherto closely associated with city-state patriotism, lost much of its significance and finally passed out of existence.

Mystery Religions: The Great Mother and Attis. But in spite of the disintegration of old faiths, men remained religious and persisted in seeking solutions for the riddle of life—the meaning of things, life's brevity, its difficulties, its griefs and pains, and the question of origin, purpose, and destiny. When the religion of Zeus and other gods failed,

men turned to other religions as, for example, that of Cybele, the Great Mother, whose worship was popular in Asia Minor. A fertility and nature goddess who yearned for her slain youthful lover Attis, she caused him to rise from the dead, become immortal, and be recognized as a god. A select group of devotees mourned for Attis and bathed in the blood of a bull, which symbolized the death of the old and the birth of a new life. A mystic union with Attis brought on this regeneration, which, however, was not a moral transformation. Worship was accompanied by weird music and frenzied dancing; at the sight of blood drawn when scourging each other, the worshipers, in a fit of ecstasy, mutilated themselves. A larger group of men and women admitted to a partial membership in the cult practiced a rite that united them with Attis, but without the extremes of mutilation.

The worship of Isis and Osiris, introduced from Egypt, was a fertility and nature cult that celebrated the recurring mysteries of dying and reviving plant life in autumn and spring. Like the myth of the Great Mother and Attis, that of Isis and Osiris went back to the agricultural and cattle-raising cultures of the Neolithic and Bronze ages. As wife of Osiris and avenger of his death, Isis became immensely popular as a mediator, and women particularly were her eager worshipers. Osiris, the slain god who rose from the dead, was ultimately supplanted by Serapis, who inherited his attributes. Believers were initiated by a rite that gave a dramatized story of Osiris's death and resurrection and promised immortality.

Mithraism, the third and most important of the great mystery religions, sprang up in Persia as an offshoot of the ancient Persian nature worship. Mithras is the god of light and assistant of Ahura Mazda in his everlasting struggle with the hosts of darkness under Ahriman. According to the mythical story, Mithras slew the bull sacred to Ahura Mazda. A dog, creature faithful to man and regarded as sacred in the Zoroastrian religion, helped Mithras bring down the bull. When Mithras plunged his sword into the bull's vitals, a stream of blood gushed forth and a serpent, symbolical of the productive powers of the earth, rose to catch it. The blood signifies the seed of life. Slaying of the bull by Mithras therefore symbolizes the life-giving forces of the universe. Followers of Mithras believed they were called to struggle by his side against the forces of deceit and wrong. They practiced baptism, had a common sacrificial meal, and lived ascetic lives. Mithraism promised a happy immortality. A fighting religion, it appealed chiefly to men, especially soldiers. Women played only a subordinate part in the concepts of Mithraism.

Besides these religions of Near Eastern origin, there were also the mystery religions native to Greece. The Eleusinian mysteries, developed

at Eleusis near Athens, were very popular. According to the myth, Persephone was abducted to the nether world by Hades (Pluto). Her enraged mother blighted the earth so that it could produce no crops until she was returned. Henceforth, in order to please both Hades and her mother, Persephone spent half the year in the world below and half in the world above, a neat explanation of the fertile and barren months of the year. A great cult grew up in which a dramatized version of the myth was enacted and the initiated given the assurance of immortality. Curiously the ceremony demanded no moral amendment. For example, no inconsistency was felt when the orator Lycias was admitted to the mysteries in company with his mistress.

Dionysus, son of Zeus and founder of the culture of the vine, also became the object of extensive worship. He was the god of summer, returning vegetation, abundance, and joy. Worship of Dionysus, widespread in the Greek world, usually became orgiastic. He was often identified with Orpheus, a half-mythical figure about whom many stories cling. Orphic brotherhoods initiated members with purification ceremonies and enjoined them from certain foods, vegetable as well as animal. They also believed in the transmigration of souls and a purificatory asceticism that enabled the soul to pass from lower and less pure to higher states, finally terminating in union with the god himself.

Career of Jesus. It is a tribute to the strength of Christianity that it rose and survived in competition with the cults described above. In counterdistinction to them, its founder is a historical character and His followers could point to a definite set of historical facts as proof of their beliefs. The dates of Jesus' career are not certain. His preaching covered about three years, probably from A.D. 30 to 33, during which He traveled with twelve disciples through Judea and Galilee. His manner of life was extremely simple, and He deliberately associated with the poor and lowly, for He possessed the ability to penetrate beneath the conventional moral and religious life of the day and recognize basic human worth. Direct in thought, He stated truths by which men should regulate their lives. "Beware of false prophets, which come to you in sheep's clothing, but inwardly they are ravening wolves. Ye shall know them by their fruits. Do men gather grapes of thorns, or figs of thistles?" (Matt. 7:15–16.) Strong appreciation of the beauties of field and flower filled His discourse, which always turned on the religious aspect of life. "And why take ye thought for raiment? Consider the lilies of the field, how they grow; they toil not, neither do they spin. And yet I say unto you, That even Solomon in all his glory was not arrayed like one of these" (Matt. 6:28–29).

To many of the Jews this unique personality seemed to be the Messiah promised long ago by the prophets, but few of them could understand

the deeper religious meaning of His preaching, especially when He refused to establish in Judea an earthly state for the Jews. Because His kingdom of righteousness was purely spiritual, it did not please the politically ambitious, who accused Him before Pilate of stirring up a revolt against Rome and blasphemously claiming to be God. He was tried, adjudged guilty, and crucified—a shameful death reserved at that time for the very worst criminals.

Story of the Resurrection. One belief held by Christians from the beginning was the Resurrection of Jesus after His body had lain 3 days in the tomb. This marvelous event is told in each of the Four Gospels and in the Acts of the Apostles, is forcefully recounted by Paul in I Corinthians 15, and is alluded to in other places. Belief in the Resurrection of Jesus profoundly affected the apostles and their followers in Jerusalem immediately after the tragedy of the Crucifixion. It confirmed their faith in the teachings of Christ and made them willing to suffer in his behalf. But to the Jews, the idea that God should become man was a fantastic and horrible blasphemy. In wrath they rejected the Christians as well as their Christ. Some of them seized Stephen, a man zealous and effective in spreading the Christian doctrine, and after bringing him before the authorities caused him, the first of a host of Christian martyrs, to be stoned to death.

The Four Gospels. The career and teaching of Jesus are set forth in the New Testament. Four little biographies called the Gospels, which bear the names of four apostles, Matthew, Mark, Luke, and John, contain nearly all the facts known about Him. The Gospel of Matthew was written for the instruction of Jews and has a Jewish tone. That of Mark represents the teaching of Peter and probably was written in Rome. The Gospel of Luke, a physician and a Gentile, contains the teaching about Christ as told by Paul. These came into existence within about a generation after the Crucifixion. The Gospel of John was written somewhat later.

The Four Gospels hold a remarkable place in literature. Few writings have been more influential or have caused more study and discussion, particularly because the events of Jesus' life are not set forth in their historical sequence and dates are not given. Even if the episodes as related are true, it is impossible to arrange them in chronological order; the attempts of various scholars to do so have only added to the confusion.

There has been much discussion about the way in which the first three Gospels are related. It is supposed that they are drawn in part at least from an earlier account and that Mark's Gospel perhaps is the oldest of the three. To disentangle the relationship of these biographies seems almost impossible. They are, however, commonly called the Synoptic Gospels because in language, order of events, and subject matter they

present a more or less common view of the life of Jesus as taught by his disciples and their followers, many of whom had seen and heard Jesus.

THE APOSTOLIC AGE. The Apostolic Age began with the close of Jesus' mission. It was so called because the disciples served as apostles, spreading His teaching to many parts of the Roman Empire. Of the original twelve, the traitor Judas was dead; but a most vigorous recruit appeared in Paul, to whom we owe fourteen Epistles, earliest of Christian writings. The First Epistle to the Corinthians, one of the earliest literary monuments of the Christian church, was composed about the year 52. The Second Epistle to the Corinthians and those to the Romans, Galatians, and Ephesians came soon after. Peter wrote two Epistles; James one; Jude one; John three, in addition to the Apocalypse, or Revelation. Little is known about the activities of the apostles save what is recounted in the Epistles and the Acts of the Apostles, a remarkable historical account written by Luke.

Few characters in history have exercised so decisive an influence on human thought as the apostle Paul. He was a Jew born in the Greek city of Tarsus in Cilicia, situated near Phoenicia at the northwest extremity of the Fertile Crescent. This was the converging point of the peoples of the ancient world; from it passed the culture of the East to the West, and vice versa. Paul was versed in Greek philosophy as well as the religious lore of the Hebrews. A bitter persecutor of the Christian communities in Jerusalem and Judea, he was converted in an extraordinary manner when on the way to Damascus and began to work for the Christian cause, carrying the gospel to cities in Asia Minor, Macedonia, Greece, and Rome, where he found martyrdom about the year 67.

Most of Jesus' disciples took a Jewish view of his teaching, considering it a gospel for the Jews alone; but Paul gladly accepted converts from among the Gentiles, or non-Jews. He was zealously supported by Peter, who defended his position by the statement " . . . Of a truth I perceive that God is no respecter of persons: But in every nation he that feareth him, and worketh righteousness, is accepted with him" (Acts 10: 34–35).

The early Christian communities followed a doctrine they believed had been taught by Jesus. It was first of all an uncompromising monotheism, based upon the older religious experience of the Jews. Christians believed in a revelation from God to all men manifested through the person and teaching of Jesus. This doctrine taught that, although man's body perishes, his soul does not die. There is to be a resurrection, a glorious day when the saved, free from all stain of sin, will enter into the heritage long ago prepared for them. The just will realize these promises because they follow the holy example of Jesus, sent by God the Father as a sacrifice to take away the guilt of human sin. Only those who

believe in His supreme sacrifice on the Cross, follow in His steps, and obey His precepts will be saved. This idea was well expressed four centuries later by St. Jerome when he wrote "To us this life is a race course; we contend here, we are crowned elsewhere."

Soon after the close of Jesus' mission, a large number of churches sprang up in Judea, Galilee, and Asia Minor and such far-flung places as Philippi, Corinth, Alexandria, and Rome. The apostles played a prominent part in the founding and organization of the churches, by virtue of the religious authority confided to them. Peter was to have a special leadership in the Christian community, his authority being based on Matthew 16: 18–19: "And I say also unto thee, That thou art Peter, and upon this rock I will build my church; and the gates of hell shall not prevail against it. And I will give unto thee the keys of the kingdom of heaven: and whatsoever thou shalt bind on earth shall be bound in heaven: and whatsoever thou shalt loose on earth shall be loosed in heaven." Later, in John's Gospel a similar statement is made to Peter: "Feed my lambs. . . . Feed my sheep" (John 21: 15–17).

There has been much debate over these passages and the part taken by Peter. It is not our purpose to take sides in the controversy, but it is necessary to indicate the essential facts in Peter's career. He was in Jerusalem during the Crucifixion and played a leading role in the formation of the church there. He preached in Asia Minor and finally appeared in Rome, dying a martyr's death at the hands of the Emperor Nero's executioners, probably by crucifixion head downward, in the year 67. There is a persistent and undoubtedly reliable story that Peter's tomb was situated at the foot of the Vatican Hill in Rome, a spot that became a shrine frequented by the pious. There, in the fourth century, the Emperor Constantine erected St. Peter's Church.

These facts, traditions, and teachings combined to establish in the early Christian community the belief that Peter in some way founded the church in Rome, that he was the prince of the apostles, and that to him had been confided the keys of heaven with power to bind and loose. Upon this premise the church of Peter in Rome assumed a leadership in religious matters that was to prove of the greatest significance to civilization. For Rome became the capital of a spiritual empire more splendid than the ancient Roman Empire had ever been, a Christian empire lasting throughout the Middle Ages and even to our own day. In the realm of the spirit the West produced no other institution to compare with it in majesty and influence. It taught men their highest ethical concepts, gave them an authoritative doctrine of life and the hereafter, and offered salvation to all who believed, regardless of position or wealth. The Roman Catholic church became the parent of culture; philosophy, theology, art, literature, and learning flourished under its protective

wing. For nearly two thousand years the history of Europe and the history of the church have been inseparably entwined.

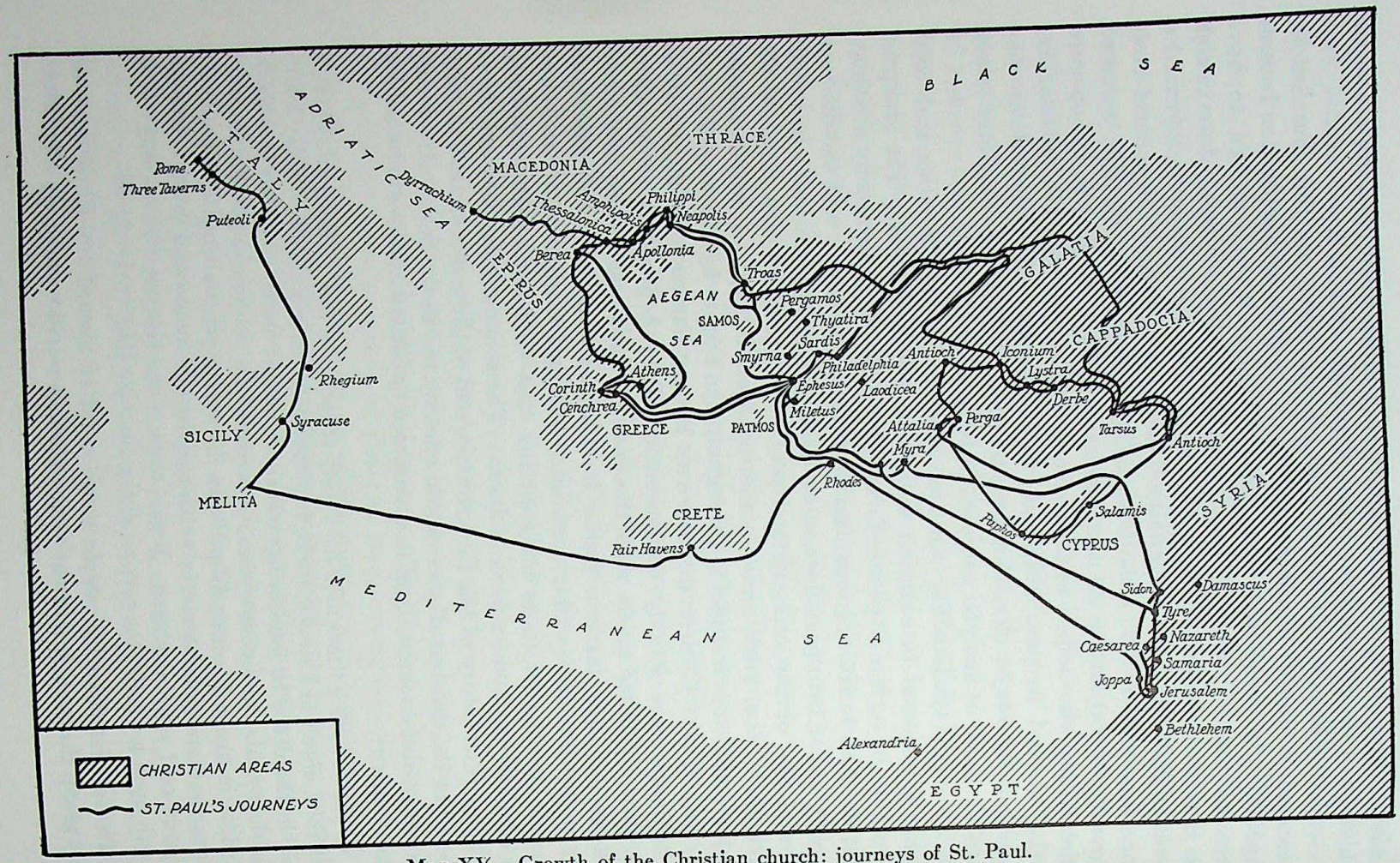
THE CHURCH: ORGANIZATION AND CLERGY. As the churches increased in number and membership, the problem of organization became increasingly important. In the early days, it had sufficed to have *episcopi*, or "overseers," and *presbyteri*, or "presbyters," from which is derived our word "priests." The overseers and presbyters formed a college that managed the affairs of the church. Later the press of business became such that the leader, the *episcopus*, or "bishop," assumed greater importance as an administrative officer. Below the bishop were the elders, who helped in the services, and the deacons and subdeacons, who assisted in poor relief and other matters. Together these constituted the major clerical orders, to which were added later four minor orders, those of acolyte, exorcist, lector, and doorkeeper.

At first, Christianity was preached in the larger cities and only gradually spread to outlying villages of the city-states. The group of churches in such a city-state formed a "diocese," governed by a bishop. Later, some territorial organization became necessary, and the dioceses were grouped into provinces, or archbishoprics as they came to be called. Boundaries of the ecclesiastical provinces coincided with those of the civil provinces, each under a metropolitan bishop. A well-developed organization was completed throughout the empire by the year 400.

THE EARLY CHRISTIANS AND THE ROMAN EMPIRE. In doctrine, the Christians were strictly monotheistic. They believed it to be sinful to have anything to do with the gods of the pagans as equivalent to renouncing their faith in God. It is hard for us today to understand the many difficulties that confronted the first Christians. The monotheistic Jew hated them for asserting that God himself had appeared on earth in the human form of Jesus. The skeptical Greeks would have nothing of the story of the Resurrection and of the teaching that as Jesus rose from the dead so all men would one day rise in the flesh. Answering his critics and enemies, Paul thus summed up his tribulations in preaching Christianity:

> Of the Jews five times received I forty stripes save one. Thrice was I beaten with rods, once was I stoned, thrice I suffered shipwreck, a night and a day I have been in the deep; In journeyings often, in perils of waters, in perils of robbers, in perils by mine own countrymen, in perils by the heathen, in perils in the city, in perils in the wilderness, in perils in the sea, in perils among false brethern; In weariness and painfulness, in watchings often, in hunger and thirst, in fastings often, in cold and nakedness. Beside those things that are without, that which cometh upon me daily, the care of all the churches [II Cor. 11: 24–28].

To understand why people were so bitter toward the Christians we must grasp that religion in the Greco-Roman world was largely a political



MAP XV.—Growth of the Christian church: journeys of St. Paul.

matter, the city-state itself promoting worship. Christianity, on the other hand, was essentially an ethical and not a political religion, and loyal Christians could not countenance polytheistic worship. Their pagan neighbors declared they were "atheists" because they denied the gods and the divinity of the emperor, who personified the Roman Empire. This patriotic aspect of the official religion was peculiarly trying to the Christians; they continually faced the dilemma of reconciling duty toward the empire and loyalty to their faith. Further, it should be noted that, being political in nature, pagan religion was closely bound up with every aspect of public life, such as festivals, office holding, service in the army, and reading of patriotic literature. Refusing, therefore, to participate in such activities, Christians were regarded as being uncivil, unpatriotic, and generally undesirable. The most libelous stories were circulated about them as, for instance, that the Lord's Supper was a riotous and immoral orgy. So the new Christian communities were outlawed, and their churches had to function clandestinely.

From their point of view, the Romans and Greeks showed much tolerance, for they did not demand that any one person worship all the gods. Polytheism was generally tolerant, but in times of public disaster it was necessary that all citizens unite in public worship before the emperor's image that the state might be saved. Citizens were eventually required to worship the emperor in public to prove they were not Christians. Those who refused because of their faith were cruelly persecuted—crucified, thrown to beasts in the amphitheater, mutilated, tortured, and beheaded. These persecutions gave rise to many a lurid tale that illuminates the martyrology of the Christian church. The history of the early martyrs furnishes an extensive collection of striking stories, many of which are historically true though some are largely legendary. In all there were ten great persecutions, during the first of which Peter was crucified and Paul beheaded about the year 67 under the Emperor Nero, who accused the Christians of having set fire to Rome; the last and most severe was prompted by Diocletian, emperor from 284 to 305, who wanted to wipe out Christianity completely.

What sort of people were the Christians? They were a select group of slaves, freedmen, humble laborers, and members of the upper classes who embraced the new doctrines in spite of their unpopularity, fully realizing the peril of their step. Convinced of the truth of Christian teaching, they tried to shape their lives accordingly, and their loyalty was often tested by the fire of persecution. Their enemies rarely could find fault with their mode of life and so were reduced to calling them atheists and repeating baseless stories about them.

The attitude of Christians was essentially otherworldly; renouncing the things of this life, they sought to assure for themselves a place

in heaven. Discipline in the early church was severe. Confession often was public, and absolution for sins was withheld until all imposed penances had been fulfilled. Martyrdom was regarded as the supreme proof of faith, and many eagerly hoped to be crucified, torn by beasts, or burned to death as an evidence of their faith.

In spite of persecution, the Christians steadily increased in number, especially during the third century. Christian communities became more and more numerous and were to be found in nearly every part of the empire, and such efforts as those of Diocletian to exterminate them failed completely. Diocletian was followed by the Emperor Constantine, who ruled from 305 to 337 and who had been brought up under Christian influences; his mother Helena is one of the saints of the church. In 313, Constantine issued the Edict of Milan, whereby Christians were given full freedom to worship. Ostensibly, Christianity became a legal religion, but in reality it was a privileged faith because of the favors of Constantine and his family. Under the royal patronage, it rapidly gained in numbers and wealth, but it was not until the reign of Theodosius (*d.* 395) that it became the sole legal faith of the empire.

ARIANISM. The Christian Catholic, or universal, faith[1] was now, legally at least, the faith of all Roman subjects. But its triumphant progress was compromised by the rise of heretical opinions, especially those preached by Arius, a priest of Alexandria, at the opening of the fourth century. Arianism taught that Jesus is less than God and more than man, contradicting the ancient orthodox belief that Jesus is true God and true man. By insisting that Jesus is less than God, Arius and his followers minimized the importance of Jesus as divine Saviour. The Greeks, who were still intensely interested in philosophic questions, tried to rationalize the character of Jesus and argued that being the Son of God he must be less than God. The Christians believed that Jesus is coeternal with God, which gave him special authority as revealer of truth and Saviour of man. In teaching that Jesus is less than God the Arians, in the eyes of orthodox Christians, undermined the metaphysical basis of Christian teaching.

Had Arius's view prevailed, Christianity would have been robbed of part of its supernatural support. Constantine took a determined step to settle the dispute and convoked a council at Nicaea in 325. The orthodox party triumphed, and the Nicene Creed was adopted, which states that Jesus is coeternal with God. Arianism later gained temporary importance when, as a result of the missionary labors of Ulfilas (*d.* 381), it was accepted as the official creed by the Germanic tribes living

[1] The Catholic faith is said to be the faith held by all Christians at all times and in all places.

along the Roman frontier in the valley of the Danube. So this theological controversy continued through the fourth, fifth, and sixth centuries.

Asceticism: Hermits. The rapid expansion of Christianity created many new problems, for the large numbers who entered the church exercised a profound influence upon the character of the Christian community. Hitherto the faithful had been a chosen company sorely tried and proved by persecution. Now many of the less worthy came into the fold, people who did not know what, in former times, it had cost to be a Christian. Some entered the church because it was good policy to do so, to the great displeasure of the zealous who had suffered and who were still willing to endure martyrdom. With horror they saw the "world" come into the church. Fleeing this "corruption," they retired into the woods and deserts, lived the life of hermits, and turned their backs upon all human relationships.

In spite of the hardships it entailed, the hermit's life found many devotees, some of whom were extreme in their asceticism. Most interesting of these hermits is St. Anthony of Egypt (*d.* 356). Deeply and even fanatically pious, he spent twenty years in the desert, shunning men and ringing a bell to ward off evil spirits. Many hermits followed him into the desert. They lived in small cells and had little to do with each other. St. Simeon Stylites (*d.* 459) lived thirty years atop a pillar he raised to the height of 60 feet. He had just enough space to lie on and drew his food up in a basket. Such "pillar" hermits were found principally in Syria.

Monasticism: Three Stages in Its Growth. The hermit's way of religious life, really the first stage in the development of monasticism, was too austere to become popular. Its chief defect was that in living long years without contact with human beings men tended to degenerate. The natural impulse to seek companionship could not be denied successfully, even to the most ascetic. The second stage in the history of monasticism began when St. Pachomius (*d.* 346) organized a common rule of religious life whereby each hermit retained his separate cell but joined his fellows in work, devotions, and the reading of the Scriptures. This proved more popular; soon there were thousands in Upper Egypt who followed the Pachomian rule. The third stage was the rule created by St. Basil (*d.* 379). He decided that the hermit's ideal was impractical and brought religious-minded men together to live in a community in which their life of worship, contemplation, reading, and manual labor was prescribed by rule. In this way the first monasteries came into existence, a fortunate development, for the hermits, too individualistic to create institutions of learning and religious inspiration, could never have been the civilizing influence in the Middle Ages that the well-regulated monastery proved to be.

Church Fathers. After the writers of the Apostolic Age, which closed with the death of John (about 101), came the Apostolic Fathers, so named from the fact that they had personally known some of the apostles and had received their instruction directly or indirectly from them. St. Clement (*d.* 96?), St. Ignatius (*d.* 107?), and St. Polycarp (*d.* 156) are the best known. After the Apostolic Fathers came the Church Fathers. As a rule, they were men of noble and vigorous character. Their literature is usually called "patristic" literature, the word "patristic" being derived from the Latin *pater*, or "father." This extensive literature is most important because it deeply influenced medieval and modern ways of thinking.

Only a few of the more significant Church Fathers can be mentioned here. St. Irenaeus (*d.* 202 or 203) was brought up as a pupil of St. Polycarp of Smyrna, who knew the apostle John intimately. He spent most of his life in Lyons in Gaul, where he suffered martyrdom. His great book *Against Heresies* is of the utmost significance in the early history of the church. Far more prolific as a writer was Tertullian (*d.* 250?), whose books give us vivid pictures of the hardships of the persecuted Christians. His *Apology* and *Against the Heathen* protested the innocence of Christians and ridiculed the crudities of pagan thought. *On Idolatry* and *On Shows* reveal the practical difficulties that confronted Christians living in a society worshiping a host of gods and delighting in lewd shows and brutal sports. St. Irenaeus and Tertullian were powerful intellects; their labors helped decisively in establishing the Christian faith in the western parts of the Roman Empire.

Bishop Eusebius (*d.* about 339) wrote the *Ecclesiastical History*, a work that covers the whole history of the church from the career of Jesus to Eusebius's own day. Containing a mass of information drawn from many other books now lost, it is the fullest account we possess of the early church. Read in every generation after Eusebius, this work has served as a model for later histories.

St. Ambrose (*d.* 397) was a public official in the Roman government, but the populace acclaimed him bishop of Milan. Although he had never prepared himself for the duties of a priest and bishop, he addressed himself with zeal to the new work and became famous as an ecclesiastical executive. He possessed something of the splendid administrative ability that characterized the better Roman officials. Ambrose was as well versed in Greek as in Latin and wrote books on various religious themes. He introduced the liturgical hymn into the church in the West.

St. Jerome (*d.* 420), born a Christian, was an excellent rhetorician. He spent many years as a hermit in Bethlehem. He learned Hebrew, wrote commentaries on the Bible, carried on a vigorous correspondence, and warred against heretics. His greatest single achievement is the

translation of the Old and the New Testament into the Latin of the fourth century. Known as the Vulgate, this is the only version of the Bible used throughout the Middle Ages.

The greatest teacher and writer of the Christian church in the West, and its most brilliant intellect, is St. Augustine of Hippo (*d.* 430). His mother St. Monica was a Christian; but Augustine at first felt little attracted to Christianity, embraced in succession a number of pagan religions, and led a dissolute life. Finally, influenced by St. Ambrose of Milan, he became a Christian and after his conversion employed his consummate gifts as a writer in defending the faith. His work most generally read today is the *Confessions*, in which he describes with the greatest frankness the moral and religious struggles through which he passed. Few autobiographies have so freely revealed an author's innermost life. The *De Civitate Dei*, or *City of God*, one of the most influential books ever written, is a refutation of the statements made by pagans after the sack of Rome by the Visigoths that Christianity was the cause of the disastrous ills which had befallen the Roman state, that the gods were angry because they were neglected. The *City of God* shows that the greatness of Rome had nothing to do with the ancient gods. St. Augustine argues that there are two cities, a heavenly city of righteousness represented by the Christian religion, and another city of evil and error represented by the wickedness of man, that the two cities are in bitter conflict but that, on the last day, Christ will reappear and subdue the forces of evil. The book provided a philosophy of history that was universally accepted in the Middle Ages. Only gradually have its conceptions been modified in modern times.

Beginnings of Christian Art: The Catacombs. Distinctively Christian art began to develop during these centuries. So long as Christianity was an illegal religion, no Christian architecture could evolve. But persecution did not keep Christians from decorating chapels in their homes or tombs in which they buried their dead, many of whom were martyrs. The most interesting tombs are the catacombs, underground recesses made in the soft rock outside the city walls. Those of Rome are especially famous and have yielded many examples of early Christian art. Among them are such scenes from the Old Testament as could be interpreted allegorically. Thus Moses striking the rock to bring forth water symbolized baptism, and the three youthful Hebrews in the fiery furnace reminded the pious of the purification that the faithful derived from Christ's sacrifice. Other pictures represent Christ as a shepherd, the Lord's Supper, the adoration of the Magi, and the raising of Lazarus. There are many pictures of men and women standing with upraised hands, called *orantes*, or "pray-ers." Most of the artistic pagan themes were improper from a Christian point of view; but artists, many

of whom were converted from paganism, continued to reproduce pagan artistic ideas. On the sides of stone sarcophagi they carved figures of Christ as the good shepherd amid vines, fruits, and animals, in old Roman fashion.

ARCHITECTURE: BASILICAS. The Edict of Milan, which legalized the Christian faith in 313, exercised a profound influence on Christian

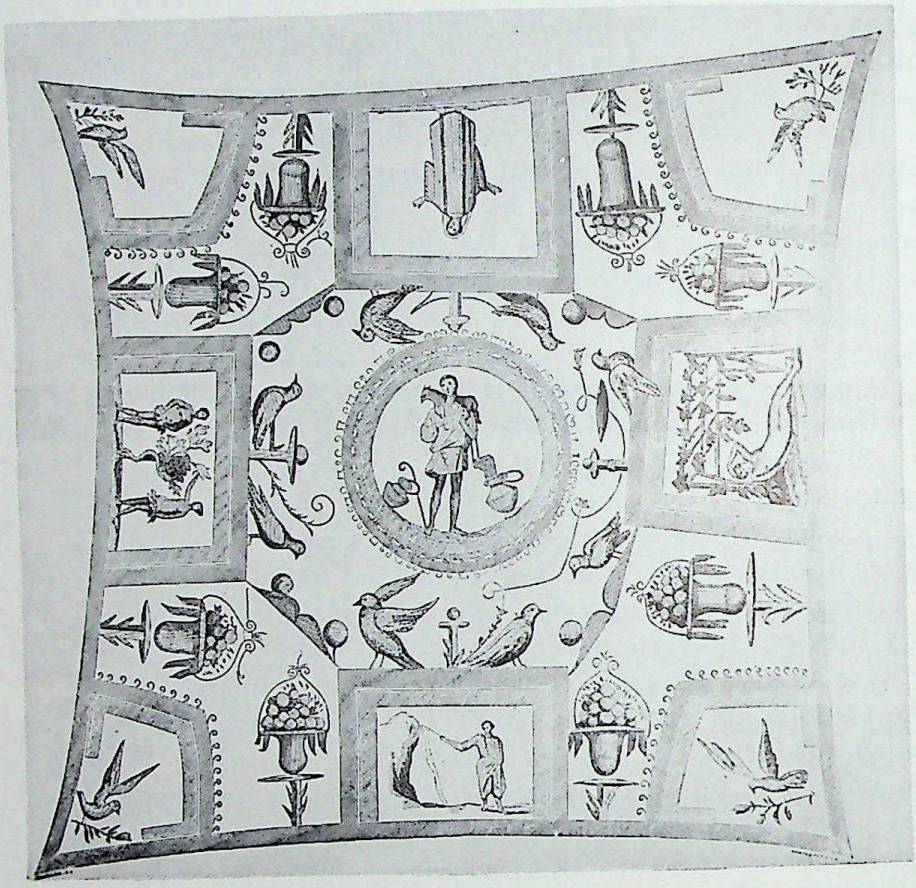


FIG. 48.—Early Christian art. Ceiling of catacombs of St. Agnes, fourth century A.D. In the center, Christ the good shepherd. On the sides, Moses striking the rock, Adam and Eve in Paradise, an orant, and Jonah under the gourd vine.

art. The church henceforth was free to develop its own art and to build churches. The first temples, constructed much like the Roman law courts, were called "basilicas." The ground plan of the simplest churches was rectangular, divided into three aisles each separated from the next by a row of columns. At the end of the central aisle, called the "nave," was a semicircular "apse." The roof over the nave was higher than the roof over the side aisles. A number of such churches, built in the fourth, fifth, and sixth centuries, are still standing in or near Rome. among them the churches of St. Paul, Santa Maria Maggiore,

St. Lawrence-outside-the-Walls, and San Clemente, the last being perhaps the most famous. In front of the church was a large rectangular structure, open in the center and surrounded by a roofed colonnade, called the "atrium." The actual entrance to the church was a covered area called the "narthex."

This style of building has since been followed in its essential features even to our own day. The Romanesque churches of the early Middle Ages are so like these ancient basilicas that students just beginning the study of the history of art easily mistake one style for the other. In some parts of Europe, churches modeled after Romanesque structures were still built even at the close of the Middle Ages. Gothic churches, erected after 1200, are but a modification of the Romanesque. Even the Greek churches with domical roofs borrowed much from Roman basilicas. This continuity in the style of church architecture helps us to understand the persistence of the religious elements of our civilization during two thousand years. The Roman Empire and the Greek world may seem ancient, but the Christian church still is with us, antedating our political organization, our economic methods, and our language and literature.

The Hebrews after Alexander the Great. While Christianity thus rose from obscurity to become one of the world's great religions, what was the fate of the Jews and Judaism? Returned to the Holy Land after the Captivity, the Jews had again set up their Temple at Jerusalem. When Alexander the Great made his conquests in Asia, the Jewish community in Palestine fell under the Hellenistic dominion and many Jews moved to distant parts, especially to Egypt. This diffusion of the Hebrews is known as the "Diaspora." A flourishing Jewish colony developed in Alexandria, where the demands of trade forced its members to adopt the Greek mode of life. But many of the Jews remained loyal to the teachings of Moses and the prophets, even when they abandoned the Hebrew language and habitually spoke Greek. About 250 B.C. there appeared in this Alexandrian colony a translation of the Hebrew Scriptures into *Koine*, the spoken Greek of Hellenistic times. This translation, known as the Septuagint, has remained an important version of the Old Testament.

The writings of Philo of Alexandria, a contemporary of Jesus, illustrate how Greek influences tended to transform Jewish life and thought. Philo (*d.* about A.D. 54), commonly called Philo Judaeus, became deeply interested in Platonic philosophy and taught that Plato's ideas are implied in the teachings of Old Testament writers. In other words, he looked at Judaism through the eyes of Plato. Not all Hebrews thus readily adopted foreign thought; most clung tenaciously to their ancient language, the teaching of the covenant, and the belief that they were a chosen people. These ideas were carried wherever Jews migrated, and synagogues were erected in many cities of the Roman Empire in spite

of the hostile attitude of the Roman government. Out of this religious life of the scattered Jewish communities came a compilation known as the Talmud, a commentary upon the law of Moses. Such a digest was deemed necessary to supplement the vast amount of oral teaching.

The dispersal of the Jews from their Palestinian homeland was stimulated by the destruction of the Temple and city of Jerusalem in the year A.D. 70. The Jews, chafing under the Roman yoke, were goaded to fury by the requirement that divine honors should be accorded to emperors. Being rigidly monotheistic, they opposed such demands and rebelled but were put down with much slaughter. Flavius Josephus (*d.* about A.D. 95), an eyewitness of these distressing events, wrote the *Jewish War*, *Jewish Antiquities*, and an autobiographical account of his career as a soldier, all books of interest and value.

Few themes in the history of Western civilization are so interesting as the history of Judaism and the rise of Christianity. Judaism illustrates the persistent appeal of religion in the life of a people. Though persecuted, the Jews for centuries remained true to the teaching of their ancient prophets. The bond that still holds the Jews together is religion —the religion of the Old Testament based upon a belief in a monotheistic god who at one time made a covenant with his chosen people Israel. Judaism, however, never became a world religion. One reason for this is its national Jewish character. Christianity, an offshoot of Judaism and more universal in its appeal, won the adherence of the Greco-Roman world and the incoming barbarians of the north.

FOR FURTHER READING

ARMYTAGE, DUNCAN: *Christianity in the Roman World*
BARDY, G.: *The Church at the End of the First Century*
BARNES, A. S.: *St. Peter in Rome*
———: *The Martyrdom of St. Peter and St. Paul*
CARTER, J. B.: *Religious Life in Ancient Rome*
EDMUNDSON, GEORGE: *The Church in Rome in the First Century*
FELDER: HILARIN: *Jesus of Nazareth*
JOCZ, JAKOB: *The Jewish People and Jesus Christ*
LEBRETON, JULES, and JACQUES ZEITER: *A History of the Primitive Church*
LOWRIE, WALTER: *Monuments of the Early Church*
MORTON, H. V.: *In the Steps of the Master*
PAPINI, GIOVANNI: *Saint Augustine*
RICCIOTTI, GIUSEPPE: *The Life of Christ*
THORBURN, T. J.: *Jesus the Christ: Historical or Mythical?*
WILLAM, F. M.: *The Life of Jesus Christ*

Chapter XVI

ROME AND THE BARBARIAN WORLD

There is no such thing as a fact without a meaning.—W. G. de Burgh

THE theme of the decline and fall of the Roman Empire is a classic one. No one can explain exactly why the Roman Empire declined. Down through the Paleolithic, Neolithic, and Bronze ages we note great cultural changes. And the tempo of change increased rapidly with the dawn of historical times. Progress in culture appears to have been a more common phenomenon than its wholesale decline. Only once, as far as we know, in the history of Western civilization has so vast a culture as that of the Greco-Roman world disintegrated. Beginning with the first century of the Christian era, there was a decline in the population of Italy, an increasing disintegration of family life. The creative impulses in Greek and Roman science withered; literature and religion languished. Art degenerated as the artists lost their ability to portray figures and depict scenes. The volume of money in circulation shrank, commerce dwindled, and monetary values so declined that copper took the place of gold and silver. The countryside was organized into large estates, freemen became serfs, slave labor was introduced, and control fell into the hands of wealthy landlords. Absolutism intensified; and with it appeared an increasingly crushing tax system to support its unreasonable demands. Finally, it was no longer possible to keep up the complex, top-heavy structure, and the Greco-Roman culture of the Western Empire disintegrated.

Reasons for the Decline of Rome. Historians have given many reasons for this distressing spectacle, but most of them are unconvincing. The theory of "racial mixture" and consequent decline in creative ability must be rejected, for the idea of "race" is so vague that it cannot be treated scientifically. The "thinning" of Roman blood with that of Celtic, German, Slavic, Asiatic, and Egyptian peoples had little influence. Reasoning based upon biological analogies is likely to prove misleading. The theory that Christianity caused the downfall cannot be maintained because the decline had set in before Christians were numerous enough to have any marked influence on public life. Nor was slavery a significant cause, for the number of slaves decreased as disintegration progressed. The barbarian invasions were made possible by the decay

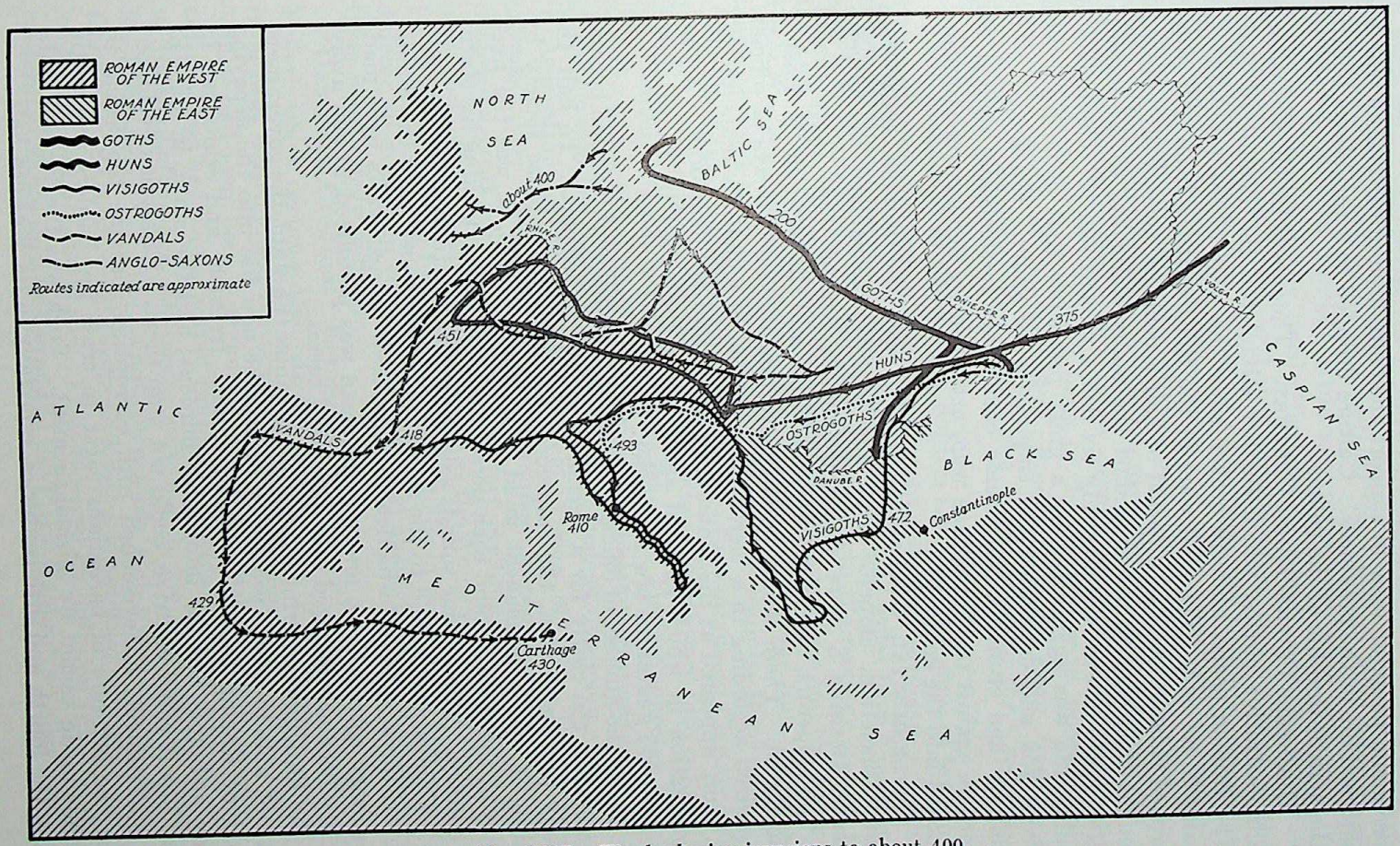
of the Roman government and its consequent inability to defend itself. Hence, the invasions did not bring on the decline. Moral degeneracy may have devitalized the upper classes in Rome and the municipalities.

Economic causes, being more obvious perhaps than others, may be considered first. It will be recalled that Greek and Roman political organization rested on commerce and industry built up in the municipalities, which enjoyed economic and social prosperity until the end of the second century A.D. The corporations, or crafts, were successful in their businesses, and the towns gave many evidences of bustling activity, as we infer from the ruins of temples, market places, basilicas, roads, bridges, aqueducts, houses, and shops dating from that time. But all this activity declined and in some places even passed out of existence. Townsmen, who depended upon business for their livelihood, decreased proportionately.

Urban life declined, especially in the northern and western parts of the empire, and agriculture took its place. Large estates owned by nobles grew up—a characteristic feature of Egypt and the Hellenistic states. "Urban economy" gave way in many places to "rural economy"; an agricultural society supplanted town life. To give adequate reasons for so revolutionary a change is difficult. It is wise, therefore, to seek several causes and not fix our gaze upon one factor alone.

First we must form a clear idea about the Roman estate, or *fundus* (plural, *fundi*), and its inhabitants. Its center was a village where the lord of the estate or his manager resided. Here also lived the workers who tilled the outlying fields. In the village stood the lord's house, often of stately proportions. Here too were the lord's winepress, smithy, mill, stables, barns, and granaries. The estate was tilled by a dependent population of colons, a class of landholders and laborers possessing many of the characteristics of medieval serfs. The reader will readily recognize in the later medieval manor many of the characteristic features of the Roman estate. The cultivable land was divided into strips; some of these were reserved for the lord but tilled by the workers, and others were tilled by the workers for their own advantage. Slaves had very generally disappeared, supplanted by freemen who had lost their free status through debt or other misfortunes. Colons were free in the eyes of the law but had lost their economic independence in that they could not abandon the land on which they had been born and which they had received from their fathers. The estate and its colons formed a type of rural exploitation that brought into existence a powerful class of landlords.

The estate supplanted the provincial city; colons took the place of its population. Because the colons were inferior in culture to the city dwellers, the level of civilization fell. It was no longer possible from an



MAP XVI.—The barbarian invasions to about 400.

economic point of view to support the cultivated upper classes who had adorned life in the provinces. Culture dropped to a rural level befitting the agricultural life of the colons.

Disasters of the Third Century. There was much confusion in administrative circles, which further stimulated the decline of Rome. The Roman peace, scarcely broken since the wars of the republic, now came to an end. The civil wars of the third century from 235 to 285 proved calamitous. In a period of half a century, twenty-six emperors fought their way to power against the many claimants to the imperial title. All but one of the twenty-six met a violent death. Confusion in public life was aggravated by a great pestilence that came from Asia about 252 and decimated the empire for 15 years. Weakened in its military and economic life, Rome could only ineffectually defend her borders against the barbarians who, attracted by her advanced culture, flocked into the country.

Governmental Bureaucracy. To save the Roman state from ruin, Diocletian, emperor from 284 to 305, reorganized the government. Desiring a more stable system, he decided that there should be two emperors, one in the West at Milan and the other in the East at Nicomedia. There should be two governments and two sets of officials organized according to a hierarchical scheme in which the emperor and his court appeared as the pinnacle of a pyramid of officialdom. A rigid organization in which political agents were controlled by those above them would guarantee law and order.

But as the number of officials increased the burden of taxation became intolerable, too costly for a declining society to support. To halt the steady process of ruin, the emperors attempted to stabilize society by casting it into a permanent mold. By the year 400, it was the fixed policy of the state to bind each person to his job, thus making his status hereditary. The scheme sounds suicidal but at the time seemed promising. Colons were bound to the soil; curials, who constituted the municipal aristocracy, were forbidden to shirk their duties; crafts were made hereditary corporations, and no craftsman was permitted to run away. Society became organized into a series of castes.

But although powerful enough to reorganize the state, the government was not able to create prosperity or breathe new life into the decaying forms of Roman society. Colons, curials, freemen, and craftsmen in many instances fled the intolerable burdens; and the state, in spite of every law it could contrive, could not stop them. Paralysis developed; the government, honeycombed with corruption, became too feeble to resist the pressure of barbarians eager to cross the borders and settle in lands made vacant by mismanagement. Such was the Roman state during the fourth and fifth centuries, especially in its Western half.

THE BARBARIANS. From conditions within the empire, let us turn our attention to the barbarians outside the border. Who were these barbarians? It is a common error to suppose they were savages. To Greeks and Romans, the word "barbarian" simply signified a person who did not speak Greek or Latin and therefore was deprived of the benefits of Greco-Roman culture. Obviously, the far-flung boundaries of the empire presented a wide variety of these so-called "barbarian" cultures as they fringed the Roman boundaries in Europe, Asia, and Africa. Those living close to the Roman border were naturally of a culture more advanced than those occupying more distant regions. Thus the Germans on the left bank of the Danube were more civilized owing to years of contact with Roman culture, than the Slavs who lived in swamps along the Pripet River north of the Carpathian Mountains.

North and east of the Roman borders lay a vast expanse of territory virtually untouched by the influences of Greco-Roman civilization. This region stretched eastward more than six thousand miles from the Rhine and Danube valleys over the Russian plain into the recesses of Asia to the Tien Shan Range and beyond, along the Amur River and the Hwang Ho. We have called attention to the peoples who spoke Indo-European languages and lived in the regions between the Danube River and the Altai Mountains and Tien Shan, the range of mountains in Central Asia. Before and after 2000 B.C. these peoples moved southward into culturally more advanced lands of the Mediterranean, the Tigris-Euphrates Valley, and the Indus River Valley. A group of similar migrations took place at the close of the fourth century A.D.; but instead of seeking new homes in Asia Minor or the Fertile Crescent, Persia, or India, the invaders crowded over the Rhenish and Danubian frontiers. The migration included a great variety of peoples; in fact, well-nigh all the tribes living in Europe and in Asia eastward as far as the Amur River and the Hwang Ho and south of the timber belt seemed to be in motion. These peoples differed so greatly in cultural and physical characteristics that studying them is extremely difficult.

DANUBIAN CULTURE. Let us first turn our attention to the Danube Valley, which occupies the extreme western end of these areas, for it is from here that the first barbarians invaded Roman lands. The Danube Valley had long been a region of an intense though primitive cultural activity and had led the rest of Europe long before the civilizing activities of Carthaginians and Etruscans were felt in the lands of the western Mediterranean. On the wind-blown loess and water-carried soils of Danubian, Rhenish, and Bohemian lands a vigorous agricultural society evolved as early as 3000 B.C. Ideas received by diffusion from far older centers of culture such as Egypt and the Tigris-Euphrates Valley modified

the life of this region. Undoubtedly there was also some original invention, as has happened repeatedly in the history of every culture.

Extending eastward from the heart of Europe into the Black Sea, the Danube River Valley formed a natural avenue by which western Asiatic influences passed northward. Shortly after 2000 B.C. a remarkable bronze culture, the Aunjetitz—so called from the site of its principal cemetery—spread over the central Danube Valley. Bronze articles, together with the secret of their manufacture, continued to pass from ancient Troy northward up the Danube. Soon after 1000 B.C. the use of iron appeared in these regions—even before the iron culture of Villanova developed in northern Italy.

This iron culture of the Danube, which spread over a wide area in western Europe, is divided into two periods. The first, extending from about 900 to 400 B.C., is known as the Hallstatt culture; the second, from 400 B.C. to A.D. 50, as the La Tène culture. We can form a good idea of the culture of the Hallstatt peoples from the rich archaeological remains. They lived by hunting, fishing, cattle raising, and agriculture. Salt appears to have been an important article of trade. Vessels were manufactured from imported copper and iron. There was commerce in tin from the British Isles, amber from Baltic lands, and, later on, luxuries of various kinds from Greek and Roman countries. This trade in articles of luxury opened the eyes of the barbarians to the wonders of Mediterranean lands; it predisposed them to move into the culturally more advanced regions. Hence, the barbarian invasions had been preparing many centuries before they actually took place.

The Celts. The people living in central and western Europe spoke languages belonging to the Indo-European group. The westernmost of these at the time of Christ were the Celts. Formerly, Celtic-speaking peoples had occupied the entire Danubian valley, appropriated Hallstatt culture, and even invaded Greece and Italy in the fourth century B.C. They had appeared in Gaul two centuries before and had carried the Celtic language into Spain. The native peoples living in those parts abandoned their mother tongues and adopted Celtic. One exception, which still persists, are the Basques, who live in the Pyrenees and whose language is wholly unlike other European languages.

The Celts lived an interesting tribal life, of which we get glimpses in Julius Caesar's *Commentaries*. Caesar's campaigns began a Romanization of the Celts. By the time of Christ, all tribes living on the Continent had been subjected to Roman rule and by A.D. 400 had become thoroughly Roman in culture. The Celtic inhabitants of the British Isles were also largely subjugated by Rome in a series of conquests. But the Celts living north of the Roman Wall, which ran across Britain from Carlisle to the North Sea, were never Romanized, nor were the Celts occupying

the mountainous and inaccessible parts of Wales; the modern Welsh, therefore, have retained some vestiges of their ancient Celtic culture. Also, the Romans did not occupy Ireland, and its Celtic culture remained untouched. But of all the Celtic peoples only these few remnants, in Scotland, Ireland, and Wales, were able to continue their old tribal life, and they too were undoubtedly influenced by Roman culture, which radiated from Britain and the Continent. Curiously, of the barbarians who lived on the periphery of the Roman state, none showed such eventual sympathy for classical culture and Christianity as did the people of Ireland.

Gaul was an important center of culture as far back as the Paleolithic and Neolithic ages. The invading Celts profited from this advanced civilization and continued to develop it from contacts with the Greeks of Massilia. The La Tène culture that grew up in Celtic lands—the second phase of iron culture north of the Alps—was marked by great progress in technique and artistic skill. The Celts manufactured excellent cloths and objects of bronze and iron, importing tin from Britain. They lived in small towns surrounded by rude walls made of earth faced with stone, cultivated the land, and raised cattle. Their religion centered in gods representing the crafts, trade, war, storms, and thunder, all of which were propitiated by gifts of gold and silver and revolting human sacrifices. Human beings were burned alive, drowned, hanged on trees, and mutilated that their writhing forms might divulge the will of the gods. Few peoples of the time retained such ferocious religious practices. Regulation of these religious practices as well as matters pertaining to justice was in the hands of druids, an active priestly organization. They were in contact with the druids of Britain and even of Galatia in Asia, settled by Celts in the fourth century B.C. The druids developed religious poetry, conducted sacrifices, foretold events, and severely disciplined their people.

The Germans. Behind the Celts as they migrated into Greece, Italy, and Gaul came the Germans. The latter crowded into the Rhine and Danube valleys well after the La Tène culture had begun. Such small groups of Celts as remained gradually amalgamated with the newcomers. Like the Celts, the Germans were a composite people who had absorbed other groups as they occupied central Europe from northern Belgium and the Rhineland to southern Russia and northward to the Baltic Sea. Scandinavia, too, was German save for districts in the extreme north inhabited by Lapps. The geographical spread divided the Germans into three groups: North Germans in Scandinavia; West Germans, who lived between the Rhine and Elbe and southward along the Danube as far as the Hungarian plain; and East Germans, who lived on the fertile plains north of the Black Sea.

The original home of the Germans was not nearly so attractive as was Gaul. It was interspersed with great swamps and impenetrable forests. Much of the soil was poor and unfit for cultivation. The climate was rainy and dark, particularly in winter. In the south, however, especially in the valley of the Danube, the land was fertile, where the Aunjetitz and Hallstatt cultures had flourished. Small wonder that the Germans tended to migrate into Danubian lands. Divided into tribes or confederations of tribes, they were led by chiefs who in many cases were regarded as having descended from the gods. Such a leader was called *Herzog*, or "leader of the troops"—*her* meaning

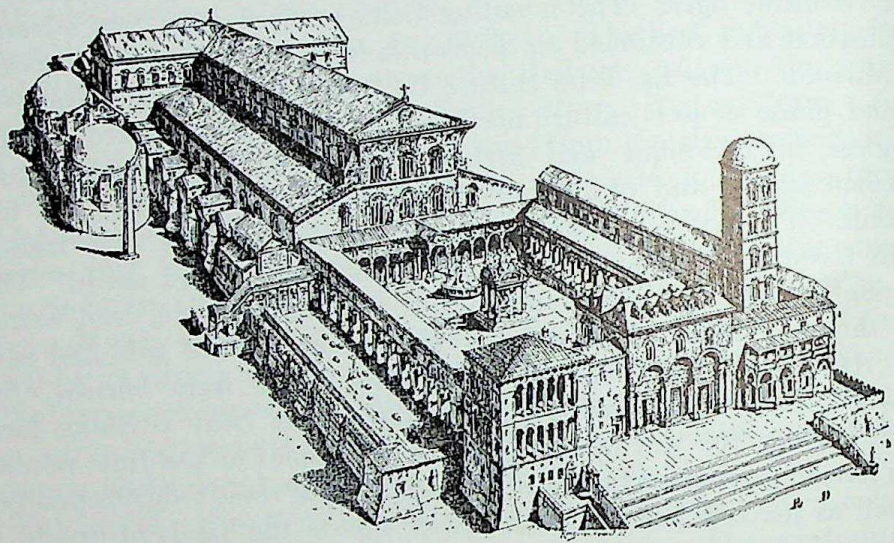


FIG. 49.—Archaeologist's conception of Basilica of St. Peter in Rome about 400 A.D.

"troops," and *zog*, "leader"—but for the sake of convenience we shall call such leaders "kings." Their religion had fewer cruel practices than that of the Celts: Woden, chief of the gods, presided in the great hall of heroes above the clouds; Thor was god of war, to whom human sacrifices were sometimes offered; Donar was god of thunder and lightning, plying the thunder hammer. There also were fertility gods and goddesses, besides lesser spirits that seem to have sprung from animism.

In material culture the Germans were less advanced than the Romanized Celts west of the Rhine. They practiced agriculture, raising the grains cultivated in this region since Neolithic times. They relied less, however, upon agriculture than upon the raising of cattle. Their food consisted of meat, milk, cheese, and butter; they wove woolen cloth and wore clothing made from the skins of animals. Household furnishings were meager. They worked iron and bronze, obtaining tin from the Celts to the west. Gold was produced in small quantities in Germany.

but silver was imported. Amber, slaves, and hides were exported to Roman lands in return for wine and articles of luxury such as clothing and jewelry. Wagons were drawn by oxen, and horses were kept for the pursuits of war.

Living in close proximity to the Romans, it was inevitable that the Germans should learn much from them. The entire length of the Rhine and Danube frontiers was carefully guarded, but there was much travel and commercial intercourse. Young Germans enrolled in the Roman army, others visited Rome on business or went as hostages, and Roman merchants frequently appeared among the tribes in Germany to exchange wares with them. Along the border within the empire and sometimes in Germany were large estates containing comfortable houses equipped with baths and stored with food. No doubt many half-Romanized Germans returned to the scenes of their childhood to visit friends and relatives, bringing tales of the marvelous civilization to the south and west. Small wonder that Rome exercised an irresistible attraction upon the German mind.

The Goths: The Alphabet and Christianity. In the second century A.D. the Goths, an East German group, moved southward and settled on the fertile black soil of southern Russia, where they became rich and powerful. They learned to write, borrowing the alphabet from the Greeks and Romans living along the shores of the Black Sea. This accomplishment was gradually passed on to other Germans, finally even to the tribes living in Scandinavia. Inscriptions using these letters were called "runes," those of the Scandinavians being the best known.

The Goths were converted to the Arian form of Christianity by Bishop Ulfilas (*d.* 381), who had received his education in Constantinople. The Bible was translated into Gothic, the earliest literary monument of any Germanic language we possess. Arian Christianity spread rapidly to other Germanic tribes living along the Danubian frontier. Thus such Germanic tribes as the Visigoths, Ostrogoths, Burgundians, Vandals, Suevians, Alamanni, and Lombards were Arian Christians before they moved into the empire.

The Slavs. The Slavs, a group of peoples likewise speaking Indo-European languages, originally appear to have inhabited the valley of the Pripet, a branch of the Dnieper. This region north of the Carpathian Mountains and west of the Vistula River in those days was a wooded and impenetrable region. In the material culture of the first century the Slavs were as far behind the Germans as the Germans behind the Celts. They borrowed from the Germans just as the latter had borrowed from the Romans. For a long time, they developed practically no agriculture, subsisting on the vegetables, fruits, fish, honey, and rabbits that were abundant in the marshy lands along the Pripet

River. They were prolific and, as their numbers grew, rapidly expanded into the vast plains to the south, east, and west. Three groups appeared —South Slavs of the Danube and Balkan regions; East Slavs of Russia; and West Slavs of Bohemia, Moravia, and the Elbe and Oder valleys.

The Asiatic Background of Nomad Life. The Indo-European peoples, described above, with whom Rome had intercourse at the close of the fourth century were rapidly increasing in number and ever mounting in the scale of civilization by borrowing elements of culture from the Greco-Roman world. Suddenly in the year 372 appeared the nomadic Huns, who emerged from the little-known regions beyond the Caspian Sea and began to plunder the people dwelling along the Ural and Don rivers—the beginning of a long series of movements among the Germans and Slavs. Students of the history of civilization have paid too little attention to the enormous influence that nomadic peoples of mongoloid and other stocks exercised upon the inhabitants of western Europe, that is, the Greeks and Romans and their so-called "barbarian" neighbors, the Germans and Slavs.

The ancient habitat of the nomadic peoples, divided into two parts by the Altai Mountains and the Tien-Shan Range, stretched eastward from the Volga River and Caspian Sea to the Sea of Okhotsk and the Yellow Sea. The nomads had developed a type of life peculiarly adapted to the conditions obtaining in those regions. Nomads were grazers who pastured their flocks wherever they found food for them and year after year followed a definite pattern of migrations. In late spring, they moved from the foothills of the Hindu Kush and the Tien Shan ranges into the scanty grasslands to the north. Gradually as these became exhausted the nomads moved farther northward into the grassy region below the timber line of the north. With the snows of autumn, they moved southward through the scanty grasslands to the mountain foothills abundantly provided with grass, where their flocks could readily sustain themselves during the winter, after which the annual trek to the north would be resumed. East of the Tien Shan Range the nomads had smaller grazing areas because of the proximity of the timber belt to the wastes of Mongolia. They pastured their flocks in the coppices of the grassy belt and wandered over the green parts of Dungaria and Mongolia, ever tending to encroach upon the Hwang Ho Valley.

Nomad Culture. The nomads traveled on horseback and were skilled riders and experts with bows and arrows. Their tribal villages composed of tents were moved almost daily in order to keep up with their flocks. Utensils and other equipment were scanty. Meat was the chief article of food, often eaten raw, and drink was made by fermenting the milk of mares, thus producing an alcoholic beverage called *kumis*. Whenever necessary, the nomads did not hesitate to drink

blood directly from the veins of their horses. The art of weaving was neglected, for they dressed in skins. Their craftsmen produced excellent objects of copper, bronze, and even of iron, all of a utilitarian nature. Shamanism, a form of religion universal on the steppes of northern Asia, consisted in the belief that the spirits of the dead, united with living relatives, helped expel evil spirits and avert misfortunes. The shaman, or priest, of whom there were a few in each tribe, possessed the power of conjuring the spirits of the dead.

Language and Physical Features. Nomadic peoples were very different from the Celtic, Germanic, and Slavic groups living in Europe. Many of them belonged to mongoloid groups, were relatively short in stature and yellow in complexion, and had coarse black hair and oblique eyes. The reader is cautioned, however, not to apply ideas about modern European peoples and races to these nomads. Being constantly in motion, they often united with strange groups, some of whom undoubtedly spoke Indo-European languages. Different stocks thus being thrown together, there was constant intermingling of blood. Race, blood, and language therefore have little meaning when one attempts to describe the culture of nomads. They spoke a great variety of languages, some of which were related; but it is impossible to detect any relationship between some of the groups. Thus the Finnish language today bears no resemblance to that of the Turks in spite of the fact that both peoples originally came out of northern Asia.

The Huns. The wandering tribes of the Asiatic steppes, driven by hunger or the adverse fortunes of war or by the desire to move onto better land in countries where political organization and military power had declined, repeatedly invaded the fertile lands to the south and the west. Such a group, the Huns, occupied the Kirghiz Steppe in Central Asia. Divided into small tribes, they were ruled along patriarchal lines by a khan. For reasons unknown, some of the Huns in the year 372 burst into the lands north of the Caucasus Mountains and attacked the Germanic Ostrogoths living along the Black Sea east of the Dnieper River. The stories that the Ostrogoths told of this invasion were enough to strike terror to the hearts of the bravest.

The historian Ammianus Marcellinus wrote an account of the appearance and culture of the Huns. They were, he said, "a race savage beyond parallel." They were skilled horsemen, for "there is not a person in the whole nation who cannot remain on his horse day and night. On horseback they buy and sell, take their meat and drink, and there they recline on the narrow neck of their steed and yield to sleep so deep as to indulge in every variety of dream." Their large and stout bodies were grotesquely supported by short bowlegs, acquired by riding horses from earliest youth. "This active and indomitable race, being excited by an unre-

strained desire of plundering the possessions of others, went on ravaging and slaughtering all the nations in their neighborhood."

Rather than try the fortunes of war with the Huns, the Visigoths who lived west of the Dnieper River fled precipitately to the banks of the Danube. There they petitioned the Roman emperor for permission to settle in the vacant lands along the right bank. They hoped to live peacefully in the territory and suggested that they be accepted as allies of the Romans and that their fighting manhood be used to drive back the Hunnish host. Their petition was granted. Accordingly, the host as numerous as "the grains of sand tossed about by the zephyrs" hurried "across the stream day and night, without ceasing, embarking in troops on board ships and rafts and in canoes made of the hollow trunks of trees."

Meanwhile, the Huns pressed westward and soon established themselves along the Danube River, especially in the expanses of what is now Hungary, where they caused much confusion among the Germanic tribes. They were relatively few in number but readily subdued the Germanic peoples as far as the upper Rhine. They were a parasitic people who attached themselves to a more numerous population, forcing it to provide them with food and other necessaries. They were polygamous and cruelly killed off large numbers of the conquered male population. Soon many half-castes appeared, who usually adopted the language and customs of the mothers. Fortunately, in the course of a few generations, the fiery zeal of the Huns declined and their predatory habits weakened. Under their khan, or king, Attila, they conducted a plundering expedition into Gaul but were defeated at the Battle of Châlons in 451. Finally, their subjects rose against these parasitic masters and utterly defeated the Huns in Pannonia near the river Nedao in 454.

Importance of the Nomads. Nomadic culture was very different from the agricultural and sedentary ways of life in Europe. Nomads subsisted in southern Russia and in the Danube Valley by enslaving the agricultural Germans and Slavs, but their cultural complex could not uproot old and fixed habits. No matter how often they appeared riding out of the Asiatic steppes they invariably ended by adapting themselves to the culture of the new environment, which was based upon agriculture and cattle raising. The nomads, however, left some permanent traces of their invasions. They greatly influenced the linguistic boundaries of eastern Europe and complicated its political geography. The Bulgars, Magyars, Turks, and Finns are all of nomadic origin. They gradually lost their Asiatic features and in some cases, as, for example, the Bulgars, learned to speak an Indo-European language. But other than this the nomad never made significant contributions to Western culture or even modified it extensively.

THE GERMANIC INVASIONS. Important as the nomadic migrations may have been in upsetting the peace of Europe and changing the political map of that continent, the incursions of the Germans were destined to have greater consequences for culture. Just what caused these invasions of the Roman Empire is not known, although many explanations have been offered. Certainly the Germans were charmed by the cultural superiority of Roman life and eager to share in its advantages. But there were other causes of migration, such as wars, famine, or flood. Some of the Germans living in the Danube and Rhine valleys moved to escape the tyranny of the Huns. Among these were the Burgundians, Alamanni, Suevians, and Vandals, who, when the Roman military defenses broke down, poured over the country. Often an entire tribe appeared on the march, all their worldly goods being packed in carts. Their provisions were limited, they were thus forced to take food from the communities through which they passed, with accompanying violence and fighting. Rarely could the tribesmen settle long enough to raise crops or animals, and sometimes they wandered through the Roman provinces for decades. That such migrations were destructive is understandable, but it does not follow that the Germans as a rule were eager to destroy Roman civilization.

The Visigoths, as we have seen, were settled on the right bank of the Danube while the Huns established their robber state on the other bank. But the Visigoths were not to find peace in Roman lands. The food promised out of the imperial granaries did not appear, having been sequestered by grafting officials; and food was lacking, for they had left their crops and flocks in Russia. The result was starvation; to assuage the pangs of hunger, they began to forage. Efforts to stop them failed; and finally a pitched battle was fought at Adrianople in 378, the first defeat of a Roman army on Roman soil by barbarians in five centuries. The wanderings of the Visigothic host continued through Macedonia, Greece, Illyricum, and Pannonia. Finally, they entered Italy under their king Alaric and in 410 seized and sacked the Eternal City itself. Next, they attempted to cross from southern Italy into Africa, where they would find broad and fertile fields to produce food for their wives and children. Thwarted by the lack of ships, they retraced their steps through Italy and settled in southern Gaul and Spain, where they established a Visigothic state that lasted until 711.

These were indeed sad days for patriotic Romans: Visigoths had set up a state in Spain and southern Gaul, the Vandals seized the province of Africa around Carthage, and the Suevians were securely entrenched in northwestern Spain. To the north the Burgundians conquered the Saône and Rhone valleys and the Alemanni occupied what today constitutes Alsace and parts of Switzerland. These barbarian states were

Arian in religion and culturally inferior. The Vandals bitterly persecuted orthodox Catholics, a reversal of events that stunned the Romans. Provinces were laid waste, and Rome itself was sacked. Surely the gods were angry; were not the ancient altars neglected and was not Christianity to blame because it had only recently become the sole legal faith of the empire? So reasoned patriotic Romans. Their arguments were silenced by the crushing rebuttal of St. Augustine of Hippo (*d.* 430) in his *City of God* (see Chap. XV, page 245).

The invasions of the barbarians, especially Germans and Slavs, exerted a decisive influence on the culture of Europe. (1) The barbarians disrupted economic and social life and hastened the decline of the empire, especially in the West. (2) They readily appropriated the more vigorous elements of Roman civilization, assimilated them, and continued to advance culturally while the Romans declined. The joining of the Roman and barbarian elements provided the common physical basis of medieval culture. (3) The invasions determined the national groupings of medieval and modern Europe; the modern linguistic map of Europe was really drawn in the fifth and sixth centuries.

Greco-Roman Cultural Contributions. Although Greco-Roman civilization sadly deteriorated and in the West had progressed a long way toward disintegration, it would be a mistake to assume that there was a complete collapse. Some of the Greco-Roman achievements, whether intellectual or material, still remained intact—impressive accomplishments that were to inspire and guide future generations. Before leaving the Greco-Roman world and taking up the study of medieval culture, let us recapitulate these contributions, beginning with the Roman accomplishments in jurisprudence.

Roman law was a complete set of principles and rules so elaborated as to be adaptable with slight change to societies far more complicated than those of Greece and Rome. Modern states, like France, have successfully guided their commercial and industrial life in the light of its principles. The medieval church borrowed many conceptions of its canon law from the Roman law. Further, succeeding ages often drew vital inspiration from the fundamental philosophic notions underlying the vast superstructure of Roman law. The idea of natural law, a feature peculiar to Roman law, was to have many applications in medieval and modern times. So in Roman law we find fundamental ideas affecting even present-day moral conceptions. The doctrine that all public authority must be exercised by the prince or, as we today should say, the state, was a characteristic principle of Roman law. Another was that the public should be consulted in regard to matters concerning its welfare. It is a curious fact that we have derived from the same Roman law principles which, on the one hand, laid the foundations of absolute monarchy

MAP XVII.—Barbarian states on Roman soil.

and, on the other, contributed to the establishment of democratic government.

The Christian religion as embodied in the Christian church—the organization that taught its doctrines—dates from the first century A.D. and hence is a contribution of the Greco-Roman world. Teaching an authoritative doctrine about the origin, meaning, and destiny of man, the church exerted a sway over the soul of man such as no other institution in medieval or modern times can boast. It created the temper of our moral life and gave to us our ideals. It carried in its bosom the vital features of the philosophies of a Greek and Roman past. Its splendid literature—the patristic—was the written means through which it was preserved and by which it made its appeal to later ages.

Even though, in Greco-Roman culture, science declined from the lofty heights it attained in Athenian and Alexandrian times, it still was to give men fundamental ideas of the world about them. For generations the questions they asked were answered by Pliny, Ptolemy, and Galen. The sounder and more fundamental teachings of Aristotle also survived and in their influence eclipsed the *Almagest* of Ptolemy. The Greek achievement in science continued to instruct the men of the Middle Ages and even laid the foundation upon which the magnificent structure of modern science was erected.

Enduring also was the classical achievement in philosophic thought. The intellectual labors of Plato continued to appeal to men and in Greco-Roman times helped to produce the elaborate conception of life that we call the Neoplatonic. Neoplatonism often captivated the minds of our medieval ancestors and has exerted a profound influence even in modern times. The marvelously solid structure of Aristotelian philosophy proved perhaps even more important; it provided in part at least the foundation of medieval scholastic philosophy. It, too, contributed much to the thought of later ages.

In literature and education, similarly lasting contributions were made by Greco-Roman civilization. What more perfect models of literary expression have men ever been able to conceive than the verse of Vergil, Ovid, and Horace and the prose of Cicero? To be able to express thought as well as did these writers was long regarded as the goal of literary effort. The educational ideas of classical times, embodied in the trivium and quadrivium, survived as the core of the modern liberal arts. Finally, we must not omit mentioning the Latin language, which today remains a medium of the Roman Catholic mass. Throughout the Middle Ages, Latin was the language of the scientific, philosophic, and literary world. Even after writers began using the language of the common people, they continued to speak Latin.

But what of the more practical arrangements of economic life? Did the Greco-Roman world contribute anything to agriculture, commerce, and industry? Greek and Roman agriculture had added much to the inheritance of the Neolithic and Bronze ages. The system of agricultural exploitation by means of large estates, a prominent feature of Roman rural life, was handed on to the Middle Ages. The elements of Greek and Roman commerce provided the foundations of later Byzantine and Arabic life, as we shall describe in the next chapters.

An impressive cultural legacy indeed! But it remains to call attention to one more contribution, in the realm of practical politics. This is the Byzantine Empire, to which we turn our attention in the next chapter.

FOR FURTHER READING

ARRAGON, R. F.: *The Transition from the Ancient to the Mediaeval World*
BRION, MARCEL: *Attila the Scourge of God*
BURY, J. B.: *The Invasion of Europe by the Barbarians*
BUXTON, L. D. D.: *The Peoples of Asia*
CARTER, J. B.: *Religious Life of Ancient Rome*
CHILDE, V. G.: *The Danube in Prehistory*
DILL, SIR SAMUEL: *Roman Society from Nero to Marcus Aurelius*
———: *Roman Society in the Last Century of the Western Empire*
HUDSON, G. F.: *Europe and China*
LOT, FERDINAND: *The End of the Ancient World*
MOSS, H. ST. L.: *The Birth of the Middle Ages*
ROSTOVTZEFF, M. I.: *A History of the Ancient World*, Vol. I
———: *Greeks and Iranians in South Russia*
———: *Social and Economic History of the Roman Empire*
———: "South Russia in the Prehistoric and Classical Period," *American Historical Review*, Vol. XXVI, pp. 203–204, 1920–1921
———: *The Animal Design in South Russia and China*
WESTERMANN, W. L.: "The Economic Basis of the Decline of Ancient Culture" *American Historical Review*, Vol. XX, pp. 723–743, 1915

Chapter XVII

BYZANTIUM: CREATOR AND BULWARK OF CIVILIZATION

The Hellenistic tradition—the Roman tradition: and the fusion of both traditions is the Byzantium Empire.—N. H. Baynes

THE disintegration of the Roman Empire in the West marks a major crisis in the history of Western civilization. So catastrophic was the decline in the Greco-Roman cultural complex that scholars have come to believe that a deep chasm was created between it and the medieval civilization which followed. Nevertheless, there was considerable continuity between the culture of the Greco-Roman world and that of the Middle Ages.

The demarcation of periods in the history of civilization is a convenient means of grasping the fundamental aspects of a culture. Few periods are so sharply delimited as the "Middle Ages," beginning with the fall of the Roman Empire in the West and extending to the fall of Constantinople in 1453 or, as some prefer, to the discovery of America in 1492. Ordinarily the first centuries of the Middle Ages from about 500 to 1000 are called the "Dark Ages." Because the Dark Ages and the following Middle Ages are important periods in the growth of our civilization, it is necessary to explain how these terms came into existence.

There was a time when scholars divided the history of European civilization into three distinct ages—ancient, medieval, and modern. They did not know anything about the important prehistory that we have described in the first chapters of this book. "Ancient" history began with the Jews and included that of the Greeks and Romans. "Modern" history began with the fall of Constantinople in 1453 or with the discovery of America. The period between the ancient and the modern, from about 500 to 1492, was called the "Middle Ages."

Scholars believed that these medieval times were unfortunate for mankind. Some still hold to this view; and most popular writers, who, as a rule, are poorly informed about medieval things, persist in depicting the Middle Ages in somber colors. This is unfortunate, for the Middle Ages, in fact, are a remarkable period in the history of civilization. Even the Dark Ages are not devoid of significant achievement.

The Byzantine Empire. The Byzantine Empire, or Byzantium, was but a continuation of the Roman Empire into the Middle Ages.

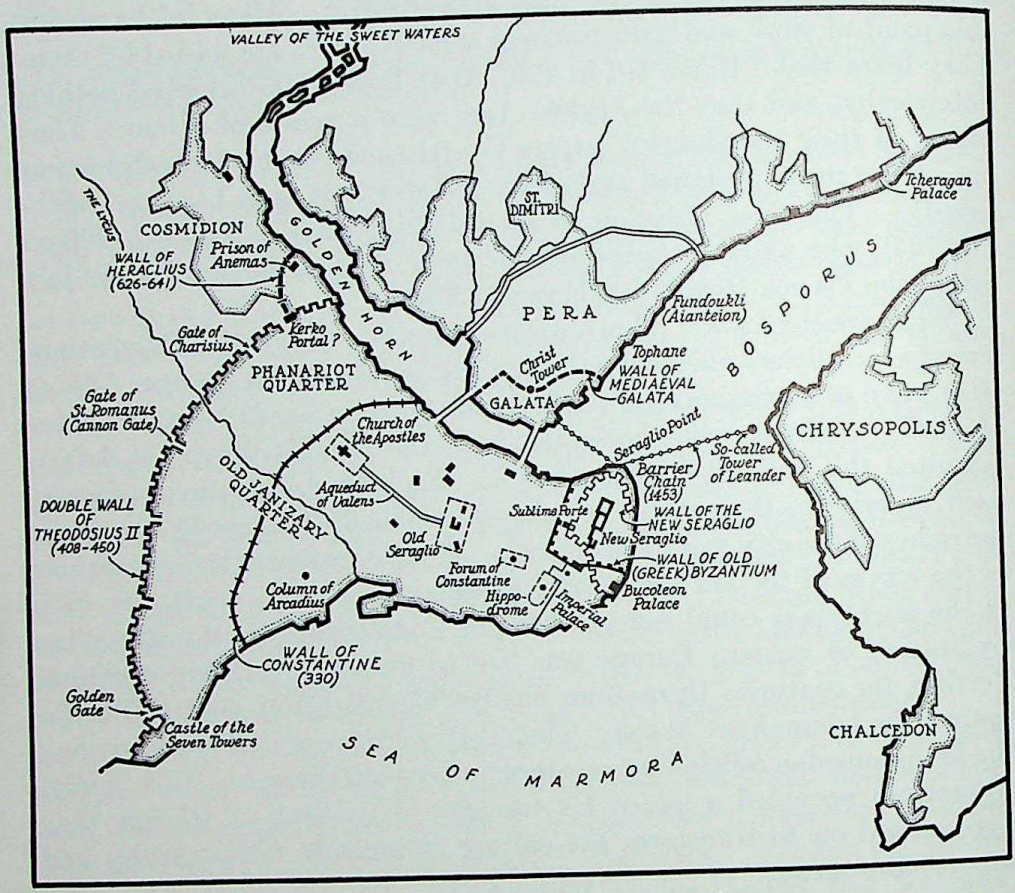
So many features of the old Roman Empire persisted that one cannot tell just when the Roman Empire came to an end and when the Byzantine began. We shall content ourselves by designating the reign of Justinian, from 527 to 565, as marking the passage from the ancient to the medieval empire.

There has been much misunderstanding about Byzantium. Regretting the disappearance of the Roman Empire, some people have thought it unfortunate that the Middle Ages supplanted it. Many books present this point of view, and unfortunately some students are misled by them. They learn that "Rome fell in 476," that Byzantium achieved nothing noteworthy, and that the Middle Ages were a period of gloom. They repeat in their examination papers the falsehood that "Byzantium was one of the most wretched and gloomy states that man has ever established!" The chief historian to spread this idea was Edward Gibbon (*d.* 1794), who wrote his great *Decline and Fall of the Roman Empire* just before the French Revolution began in 1789.

What are the facts? Down to the year of its destruction, Byzantium served as a bulwark sheltering the civilization of western Europe. Wave after wave of barbarians—Slavs from the north, nomads from the plains of southern Russia, wild horsemen from the Kirghiz Steppe of Asia—assaulted the walls of Constantinople. Each time, the empire showed itself superior to these rough peoples who looked with greedy eyes upon the riches of the city and its provinces. We may compare these invasions to the waves of the sea impotently breaking on a rocky coast. So long as the barbarians could not get beyond Constantinople, the struggling civilization of western Europe was free to work out its own salvation. Further, for centuries Byzantium blocked the road from Asia to Europe against the triumphant Arabs. Thus they were prevented from carrying the Mohammedan religion into eastern and central Europe. And, finally, Byzantium provided a haven for the arts of civilization, whence they were passed on to transform the culture of nomads, Slavs, Arabs, and western Europeans.

Geography of the Byzantine Empire. Byzantium embraced the eastern part of the old Roman Empire; its territory included Greece, the Balkan Peninsula south of the Danube, western Asia to the Tigris-Euphrates Valley, Egypt, and parts of Italy. This was all that remained of the Roman Empire after the invasions of the barbarians during the fifth century. The Arabs in the seventh century seized Egypt, Syria, and the Tigris-Euphrates Valley. Other enemies whittled off territory from time to time until in the fifteenth century only a small strip along the north shore of the Bosporus and the Dardanelles, including Constantinople, remained in Byzantine hands.

Constantinople, the capital of Byzantium, occupied a position of unrivaled advantage. Situated on the north shore of the Bosporus, which connects the Black Sea with the Sea of Marmora and the Aegean, it controlled ancient and important trade routes. Its location at the bridgehead between Europe and Asia Minor ensured control over movements between the two continents. It also possessed a military aspect that must be studied carefully. Constantinople was built on a peninsula



Map XVIII.—Medieval Constantinople.

that could be readily fortified. It therefore controlled naval operations between the Black and Aegean seas and military movements between Asia and Europe. Rarely have geographical influences spoken so eloquently as in the history of Constantinople.

Economic Aspects. In spite of the decline in prosperity in the Mediterranean world, Byzantium remained rich. Here the ancient Greek economy continued with some of its former virility. The estates of Egypt, owned by the emperor, remained a reservoir of wealth. Syria still was rich, and its merchants became important dealers in articles of

luxury everywhere in western Mediterranean lands after the economic decline had ruined the trade of local merchants. Through the Bosporus and the Dardanelles poured the agricultural products of the southern Russian plain to nourish the densely populated lands of the Mediterranean world. To the east there were business connections with Persia, India, and Ceylon. From this quarter came the spices of the East Indies, the silk of India and China, and all manner of luxurious goods. Trade flourished, and Alexandria, Antioch, Tarsus, Smyrna, Trebizond, Constantinople, Thessalonica, and Patras became important centers of business.

Production of silk and the manufacture of silk objects were fundamental industries in the economic life of Byzantium. The silkworm had been raised in northern China long before Christ, and silk cloth was a characteristic article of Chinese luxury. But the secrets of the silk industry had been jealously guarded, and for centuries only finished silk cloth was sold beyond the borders of China. Silk cloth had been known in the Greek world as early as the days of Alexander the Great. Silk was exported by caravans following ancient commercial routes westward through Turkestan; but Chinese merchants rarely proceeded farther to the west than Samarkand, nor did traders from the Mediterranean world often visit China. So the bulk of this profitable middleman trade fell into the hands of Persians, who imported silk from Turkestan and also from Ceylon, to which it was brought in Chinese junks. After exacting enormous profits, they permitted it to pass into Byzantine lands through certain cities in the Tigris-Euphrates Valley.

Finally, raw silk, as well as the finished product, came to be imported, and its manufacture became an imperial monopoly in Byzantium. Factories regulated by the state were erected in Constantinople, Tyre, and Beyrouth. The technical perfection of the looms and the quality of the workmanship gave the Byzantines a monopoly of this trade throughout western Europe. Silk was important for the vestments worn by the clergy. The numerous wars with the Persians interfered with this trade and produced serious periods of economic depression. Silkworm eggs, however, were smuggled into the empire by monks, who hid them in their canes. Soon silkworms were raised in great quantities. As mulberry groves multiplied, Byzantine manufacturers from the time of Justinian onward became independent of their Chinese source. Production of raw silk as well as finished cloth made the Byzantine Empire immensely rich and the city of Constantinople the most beautiful in the world of that time.

Constantinople. Founded by Constantine (*d.* 337), Constantinople was the most striking European city throughout the Middle Ages. The peninsula on which it was built was bounded on the north by the Golden

Horn, on the south by the Sea of Marmora, and on the east by the Bosporus. The walls of Constantine, begun in 324 and finished in 330, soon were too small for the numerous population. A second wall, constructed by Theodosius II, emperor from 408 to 450, is still standing and bears eloquent testimony to Constantinople's size and power.

Magnificent buildings were erected near the eastern point of the peninsula. Here was the Forum Augustaeum, a spacious market place, in which stood the Golden Milestone, starting point of the roads of the empire, from which all distances were measured. Here also stood the splendid Baths of Zeuxippus, the house of the senate, and the palace of the bishop, or Patriarch, of Constantinople. West of the Forum Augustaeum was the Hippodrome, a magnificent structure containing the race course. At its northern end was the Kathisma, or Imperial Box, whence the emperor and his court viewed the races. Beyond soared the dome of the church of St. Sophia. Here also began the Mese, or Middle Street, which ran through the entire length of the city to the Charisian Gate. The Triumphal Way branched from the Mese and led to the Golden Gate. Everywhere were churches, baths, hospices, booths, and market places. The imperial palace occupied the ground east of the Augustaeum, being separated from it by a wall. Admission to the palace was had only through the royal gate facing St. Sophia.

Within a century after the founding of Constantinople the city population numbered perhaps a million. It was inevitable that the capital of a mighty empire which at the same time was advantageously situated for trade and possessed important manufactures should grow rapidly. The numerous occupations were each lodged in the hands of a guild, an organization whose purpose was to carry on a trade or industry. Among the more important groups were the notaries, jewelers, bankers, silk-garment merchants, dealers in Syrian silks, dealers in raw silk, silk spinners, silk weavers, linen merchants, perfume dealers, candlemakers, soapmakers, victualers, leather cutters, butchers, pork dealers, fishmongers, bakers, tavern keepers, plasterers, carpenters, and store workers. Some of the guilds had charge of businesses that supplied a world-wide market, like the silk industry, and became immensely wealthy. Others, like the fishmongers' and bakers', which supplied only a strictly local and therefore limited market, did not fare so well. The guilds of Constantinople were regulated by the government for state purposes. An official, called the prefect, was appointed by the emperor to see that the guilds followed the minute regulations laid down in imperial edicts.

Persia and Its Influence. The emperorers of Rome and Byzantium borrowed some of their ideas of government from the Sassanid rulers. The carefully organized hierarchy of officials formed by the Emperor Diocletian, who ruled from 284 to 305, no doubt owed some of its inspira-

tion to Persia. The elaborate court etiquette of Byzantium also came from Persia. Submissive officials, prostration before the emperor, brilliant costuming, and elaborate use of gold—all suggest Persian influence. The idea of universal empire to which Byzantine emperors pretended also reveals Persian conceptions.

For these reasons, no study of early Byzantine civilization is complete without some attention to its mighty neighbor Persia. Persia suddenly rose from the century-old weakness into which it had fallen at the time of Alexander the Great. During this time the Persians had continued their ancient mode of life under the influence of Greek and Greco-Roman civilization. But the ancient Persian conceptions were never obliterated. In A.D. 226, Ardashir I seized the government of Persia and founded the Sassanid line of rulers, whose state lasted until the Battle of Nahavand (641), which marked the beginning of Arab rule. During four centuries, therefore, Persia prospered and influenced her Roman neighbor in many ways.

The ancient Zoroastrian religion of the Persians had persisted during the five centuries following the conquest of Alexander the Great. This religion, though slumbering, remained the chief inspiring force of Persian life. By clinging to it, Persians were able to resist the constant inroads of Greek and Greco-Roman civilization and the preachings of Christianity. Against these foreign influences the Persians revolted, reviving the worship of Ahura Mazda. Ardent Zoroastrians, the Sassanid rulers vigorously spread the fire cult, designating themselves as gods and asserting that they had a right to world domination. The revival of Persia was founded on religion and was ardently nationalistic.

Having received all authority from Ahura Mazda, the Sassanid kings were unfettered in the exercise of their authority. Life and death depended upon their nod. Theirs was a government founded on divine sanction. They wore massive bejeweled crowns and arrayed themselves in the richest of raiment covered with gold and jewels. The Sassanid court was brilliant, its officials submissive and sycophantic. All who approached the king were required by rigid rules of etiquette to humble themselves by kneeling. The priesthood was powerfully organized and exerted as much influence as did the priesthood of ancient Egypt. The government was composed of a hierarchy of officials, each grade being subordinated to the one above. The Sassanid state was Zoroastrian and national, anti-Christian and anti-Roman.

Persian religion exercised a strong fascination upon some Christians. We have noticed the rise of Mithraism, a form of Zoroastrianism, which became a chief competitor of Christianity. Perhaps even more dangerous was Manichaeism, which originated with Manes (*d.* about 275) and which is sometimes called "Christianized Zoroastrianism." It taught that the

universe is composed of two eternally contending principles, Good (spirit of light) and Evil (matter or darkness). The material world springs from light and darkness commingled. Humanity is a part of this material world, each man being formed of evil matter containing particles of light.

Manichaeism, therefore, was a system of dualism. Unlike Christianity, it taught that evil resides in matter. Salvation results from following the teachings of Manes and carrying out his commands. These consisted in abstaining from sensual enjoyment and material things. Innocent pleasures, many of which are normal to man, were forbidden. Flesh foods, wine, and sexual relationship were avoided; even ownership of property was forbidden.

Manichaeism was most ascetic, but it appealed to the people of the time. It spread into the Roman Empire, and St. Augustine of Hippo followed its doctrines for nine years. Later, about 1200, it reappeared in what is known as the Albigensian heresy.

The Byzantine Emperor. Notwithstanding the Persian influences described above, the emperors of Byzantium in the main continued the conceptions and institutions of their Roman predecessors. The Roman tradition that city-states managed public affairs by their popular assemblies persisted as an ideal, no matter how much democratic conceptions declined. Throughout the centuries of Byzantine public life, it remained the theory that the emperor, though absolute, was an elected officer and that his position was conferred by the senate of Constantinople. Sometimes this body acted at the suggestion of a rebellious army, sometimes under the pressure of an enraged populace that had faint memories of the authority it had once exercised. In the days of Justinian the circus factions expressed passionate views as in the Nika Riots of 532, when the crowd in the Hippodrome shouted at Justinian, who tried to address them, "You lie, ass, you are swearing a false oath!" On another occasion when his tardy appearance delayed the races, the crowd taunted him. "You have kissed the bottle too often; you will get into more trouble!"

The Church: "Caesaropapism." The Byzantine Empire was avowedly Christian. The church had the usual officials such as bishops and archbishops, besides priests, abbots, monks, and nuns. The bishop, or Patriarch, of Constantinople was head of the church and managed its affairs with efficiency. In theory he was chosen by the bishops of the dioceses, but it should be noted that the emperor so controlled elections that the Patriarch became an imperial appointee. The emperor did not interfere directly in the management of the church, but it was possible for him to dictate even in matters of dogma, as happened in 728, when he decreed the removal of images. The Patriarch crowned the emperor, but in his capacity as first citizen of the empire rather than as the chief

of the clergy. The emperor was God's lieutenant on earth and his power over the Patriarch transformed the church into a state church. This control of the church by the state is called "caesaropapism"; it is a conception typically Byzantine.

Byzantine Military History. Wars played a commanding part in the history of the Byzantine Empire. Without some knowledge about these, we should not be able to explain the cultural history of the empire. Hardly a generation passed in which the government was not called upon to meet some unusual military danger. The resulting pressure influenced all phases of Byzantine life and culture and was a chief factor in its decline, especially after the eleventh century. Compelled to bear the brunt of barbarian, Arab, and Turkish attacks, Byzantium built up a remarkable army and navy.

There were no standing armies at this time in western Europe. Such armies as were called out were small and poorly drilled and had to equip themselves. This was due to the fact that in western Europe a manorial, or agrarian, economy had succeeded the money economy of the Roman Empire. But Byzantium, owing to her position of unrivaled economic advantage, received vast sums of ready cash for the coffers of state. This enabled the emperor to produce an efficient standing army that numbered about 120,000 men. They were well drilled, well commanded, and regularly paid. In time of grave danger, the standing army was increased by mercenaries like the Varangians, or Norsemen, who sold their services to the emperor of Constantinople, or Micklegard (great city) as they called it. The cavalry, most important branch of the service, was equipped with bows and lances. All soldiers were provided with armor, and the infantrymen carried spears. The generals were skillful tacticians and managed campaigns carefully, which was remarkable, for in western Europe scientific warfare was unknown. Managed and equipped in this fashion, the Byzantine army was invincible and played a great part in defending Europe.

Byzantine military resourcefulness produced a remarkable system of military governors. There was constant danger that the Arabs might overrun the country. Formerly, civil and military authority were kept distinct, a practice dating from the days of Diocletian, who wished to weaken provincial governors and local commanders so that they could not undertake a successful rebellion. But so serious was the Arab threat that Constantinus, who ruled from 641 to 668, decided to place all civil as well as military power in the hands of military governors. He dissolved the old and created a small number of new provinces called "themes." Each theme was ruled by a general who commanded a provincial force of cavalry and infantry that left the theme only in time of war. This reorganization proved most effective. Not till 1071 at Manzikert was

the army defeated, owing to the failure of the general to exercise the caution usually observed by Byzantine generals.

The navy was almost as important as the army in maintaining the prestige of Byzantium. An adequate fleet was necessary, for Constantinople commanded the Bosporus and ruled over many lands along the Mediterranean coast. Twice, in 672–673 and in 718, the navy repelled the Arabs from Constantinople. It was repeatedly used to put down piratical Arabs. In 961, it seized Crete, which had fallen into Arab hands. Byzantine men-of-war belonged to a type called dromonds, or "runners," large ships carrying as many as three hundred men. Biremes were smaller and swifter and, as a rule, were provided with battering rams and other devices to board the enemy's decks. Their most telling weapon was Greek fire, a secret compound of charcoal, saltpeter, and sulphur that burned under water. Hurled upon hostile ships in hand grenades and by catapults, it was particularly effective.

Enemies of Byzantium. During the turbulent years when great tribal movements were taking place in the regions of Europe and northern Asia, Byzantine life was stable and prosperous. Constantinople and its dependent territories seemed like a placid island in a tempestuous sea. The Slavs in particular exerted pressure in every direction, a constant threat to the empire. They were an extremely prolific people who lived by hunting, fishing, and gathering roots and fruits in swamps. Moving out of the marshes, they acquired some knowledge of agriculture and cattle raising. The West Slavs occupied the valleys of the Oder and Elbe rivers and also Bohemia. The East Slavs pushed over the areas of Russia, occupying the central timbered regions and the steppe country of the south.

But it was the South Slavs, who occupied the Danube Valley, that chiefly concerned the Byzantine Empire. They crossed the river, slipping stealthily past the guards, to overrun the Balkan Peninsula and establish themselves in its fertile land depopulated by war. The reign of Justinian (*d.* 565) witnessed their first inroads. By the close of the sixth century they had found their way into Greece, and everywhere the typical Slavic features began to modify the physical types inhabiting these lands. But in the cities of the coast, especially in Greece, the ancient Greek culture remained and the newcomers adopted the language and customs of Greece. Thus was accomplished by the eighth and ninth centuries the Slavic expansion over the region lying between the Elbe and the Ural Mountains.

The nomads, like the Slavs, were a perpetual threat to the Byzantine Empire. They were more dangerous, however, because they were splendid horsemen as well as cruel fighters. The regions north of Constantinople were continuously disturbed by their incursions, at times

carried even to the walls of Constantinople. The Huns ravaged the peninsula, the Avars occupied the middle Danube Valley and ravaged the Balkans, the Bulgars later appeared and amalgamated themselves with the Slavs living there. They even forgot their ancient language, appeared Slavic, and by 600 were firmly established in what today is Bulgaria.

Slavs and nomads were unable, however, to offer a prolonged resistance to Byzantine arms, and the empire was usually able to reduce them. But it was far different with the culturally more advanced enemies in the Tigris-Euphrates Valley and Arabia. For four centuries, relations with the Sassanid kingdom of Persia were hostile. Desperate wars were fought, those of Justinian with King Khosru being the most severe. The Emperor Heraclius, who ruled from 610 to 641 and is one of the greatest military figures in Byzantine history, finally defeated the Persians in the Battle of Nineveh in 627 and crippled them as a military power. This victory did not prove a permanent benefit, however, for the Mohammedans were just then founding a new state that was to prove even more dangerous to Byzantium than Persia had ever been. The Byzantine Empire had constantly to deplete its resources to fight its enemies. Ultimately the task proved too exhausting, and Constantinople fell in 1453 under the assaults of the Ottoman Turks. The marvel is not that Byzantium succumbed but that it was able to resist so long and so successfully.

Intellectual Life in Byzantium. Everybody among the upper classes in Constantinople believed that a thorough education was indispensable for citizenship. Ignorance was heartily despised. Boys in their sixth year were introduced to Greek grammar to prepare them to appreciate the glories of Greek literature. They began with writing themes in Attic Greek, reading the Greek classics, and committing long passages of Homer to memory. Rhetoric, begun in their fourteenth year, introduced them to the orators and other prose writers, especially the philosophers. Geometry, arithmetic, astronomy, and music—the quadrivium, as these subjects were called in western Europe—were also studied. At every stage there was instruction in religion, the Bible, and the Greek Church Fathers. There were libraries well stocked with the ancient classics. Schools were founded for the training of boys, and the university, created in 1045, became famous for its instruction in law, philosophy, theology, and the ancient Greek classics. There was nothing like it in western Europe before 1200.

A considerable body of literary works in Greek appeared. A few romances were written, but especially noteworthy was the work of the historians. Grammatical and archaeological scholarship was particularly prized. In the tenth century, Suidas produced a dictionary and encyclo-

pedia containing an immense number of quotations drawn from a multitude of works that in most cases are now lost. Because he dealt with pagan as well as with Christian subjects, his work is invaluable for students of ancient Greek literature. Another noteworthy scholar was Michael Psellus (*d.* about 1078), who so loved the philosophy of Plato that he instituted a revival of Platonism. He wrote on philosophy and, in fact, covered history, grammar, physics, law, theology, music, medicine, and astronomy. Psellus, like Suidas, was a universal literary genius

FIG. 50.—St. Sophia, Constantinople.

of the encyclopedic sort once common in Alexandria. Through him, in part at least, was perpetuated the idea that literary culture is of the highest importance to civilization.

In spite of the decline in every aspect of ancient life, some of the ancient Greek spirit persisted. The people spoke the Attic form of Greek. Greek literary works were copied and read by the upper classes. The use of Latin declined; Latin classics were not read after the death of Justinian. Men liked the ancient rhetorical way of expressing thought; they fondly quoted Homer. So common was acquaintance with this poet that all who pretended to any literary education recognized instantly allusions to

the *Iliad* or the *Odyssey*. Leo the Philosopher, Archbishop of Thessalonica, displayed the keenest zeal for Greek pagan literature and implanted an affection for it in the minds of his pupils. One of these, named Constantine, penned an attack against his master in the following verses:

I, Constantine, these verses wrought with skill,
Who drained the milk of thy dear Muse's rill,
The secrets of thy mind I searched and learned,
And now, at last their sinfulness discerned!

Continuing, he reproached Leo for his impiety.

Teacher of countless arts, in worldly lore
The peer of all proud wise men of yore,
Thy soul was lost, when in the unhallowed sea
Thou drankest of its salt impiety.
The shining glory of the Christian rite
With its fair lustrous waters, the awful might
Of the great sacrifices, the saintly writ—
Of all these wonders recking not one whit,
Into the vast and man-monster'd deep
Of heathen Greece did thy fair spirit leap,
The prey of soul-devouring beasts to be.
Who would not pity and make moan for thee?

This poem was much criticized, but Constantine did not yield. Calling upon Christ, the sole source of truth, he roundly condemned pagan Greek literature.

Foul fare they, who the gods adore
Worshiped by Grecian folk of yore—
Amorous gods, to passions prone,
Gods as adulterers well known,
Gods who were lame, and gods who felt
The wound that some mean mortal dealt;
And goddesses, a crowd obscene,
Among them many a harlot quean;
Some wedded clownish herds, I trow,
Some squinted hideously enow.[1]

Byzantine Science. A practical people, the Byzantines were successful in commerce, war, governmental administration, and agriculture. But they lacked the ancient Greek's eagerness to study science and create new knowledge. In medicine, however, some of the old spirit lingered on. Galen provided the information needed in medical practice,

[1] Bury, J. B., *A History of the Eastern Empire from the Fall of Irene to the Accession of Basil I*, pp. 440, 441, Macmillan & Company, Ltd., London, 1912.

and a few doctors possessed originality and even improved upon some of Galen's teachings. One, Alexander of Tralles (525–605), made original observations upon gout, insanity, dysentery, and biliousness. Though successful in discovering vermifuges, he was not above using charms, a weakness common to other Byzantine medical men. Another noted practitioner was the surgeon Paul of Aegina (625–690), who wrote an *Epitome* containing in condensed form all that doctors of his day knew about medicine. He was especially competent in operations for the

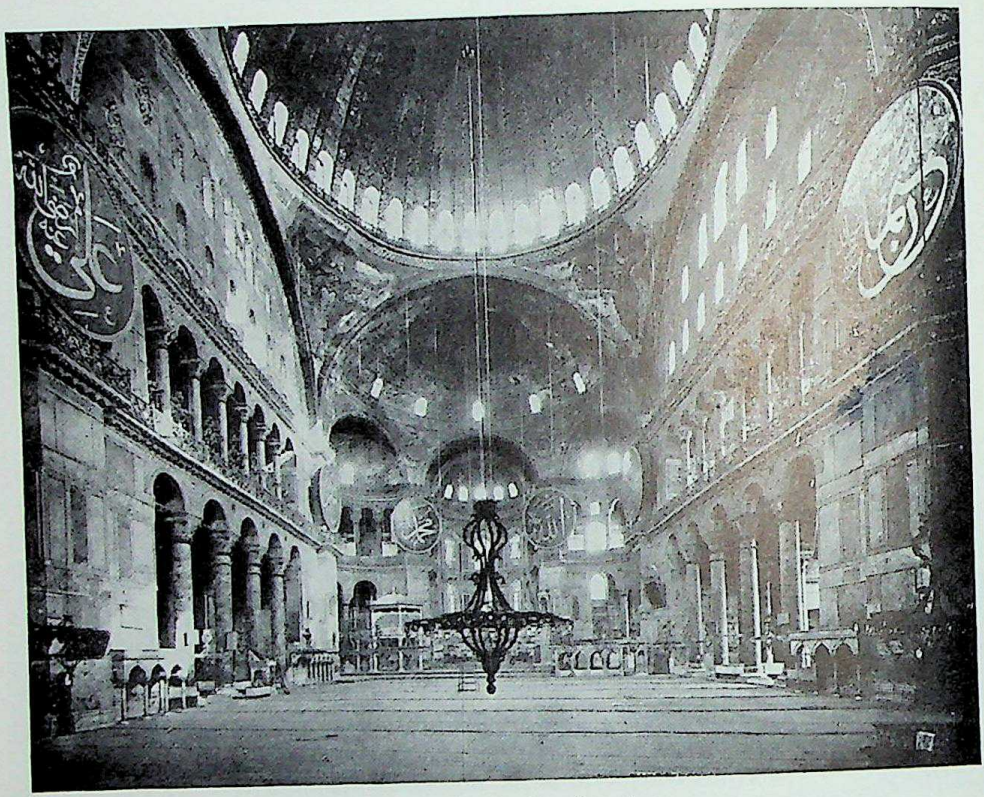


Fig. 51.—St. Sophia, interior.

stone, in the removal of tonsils and infected breasts, and in obstetrics and pediatrics. There were other skillful doctors, but few advanced beyond Galen. Byzantine physicians helped in the everlasting fight against infectious diseases such as smallpox and diphtheria, which caused serious trouble in a crowded city to which merchants, travelers, pilgrims, and soldiers came from all quarters. Medieval Byzantium developed methods of quarantine that were copied in the rising towns of western Europe.

Byzantine Art. In the history of art, Byzantium occupies a lofty position. When Constantine built Constantinople, he took the finer statues still adorning the old Greek towns and set them up in the Hippo-

drome, the Augustaeum, and other places. Gracing the public squares of the city until 1204, they helped perpetuate the beauty and ideas of ancient Greece. Among them were the "Hera of Samos," the "Heracles" by Lysippus, and "Romulus and Remus with the Wolf." Could an Athenian of the days of Pericles have been brought to life in medieval Constantinople, he would have found much he could understand. Besides these visible relics of classical antiquity, there were the Greek language, the ancient classics, and some architectural ideas. The art of Byzantium obviously is a continuation of ancient Greek art.

The same Athenian would have noted one puzzling fact, however: Constantinople was filled with splendid temples dedicated to Christian

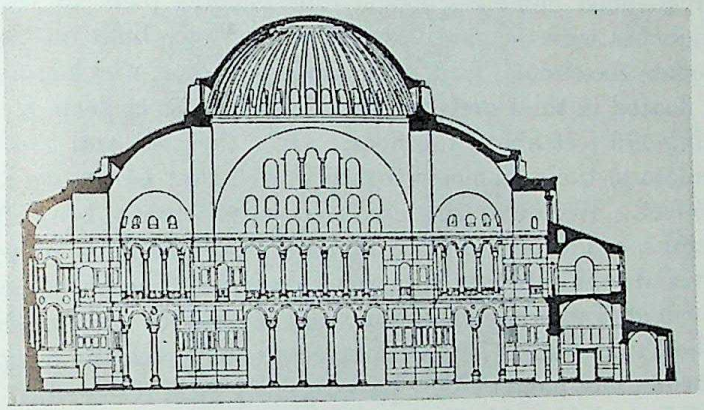


FIG. 52.—St. Sophia, cross section.

worship, representing Byzantine architectural skill at its best. After Christianity had become a legal religion in 312, temples called basilicas were built throughout the East, constructed in the form of a Greek cross and surmounted by gigantic domes made of carefully fitted stone blocks. This style, in various modifications, spread over the Mediterranean world and even into Russia. The Arabs also appropriated it for their mosques.

Magnificence was the prime characteristic of Byzantine art; impressive effects were desired above all else.

> Everywhere in it we find that love of stupendous luxury and of prodigious splendor which Byzantium displayed at every period of her history. In the decoration of churches and palaces it is always the same story—precious marbles, glittering mosaics, magnificent work in gold and silver, and wonderful hangings, all intended to enhance the beauty of the rites of religion, and the majesty of the imperial person; in public and private life nothing but sumptuous tissues shot with purple and gold, fine carved ivories, bronzes inlaid with silver, richly illuminated manuscripts, enamels, cloisonné in resplendent colors, gold and silver plate, and costly jewels. Whether, by decorating the walls of churches with the

pageant of sacred history skillfully disposed, this art was intent on glorifying God, on expressing an article of faith, on interpreting the liturgical rites, or whether, to glorify the majesty of the sovereign and to give pleasure to the court and to the grandees, it was depicting in a more profane spirit subjects borrowed from classical history or mythology, picturesque scenes dear to Hellenistic art, as well as historical paintings, representations of imperial victories, and portraits of the princes in their glory, everywhere we find that love of magnificence which even today makes us visualize Byzantium in a jeweled iridescence, in a shimmer of gold.[1]

St. Sophia, constructed by Justinian, is the most remarkable church in Constantinople. The central square of 107 feet on each side is covered by a vast oval-ended dome resting on four massive piers 25 feet square. Huge squinches with pendentives of masonry were built on the piers to accommodate the circular form of the majestic dome, which rests on them "as if it floated in the clouds." This dome is 46 feet deep, its topmost point being 179 feet above the floor. Over the aisle and the choir are two semidomes, their diameter together with that of the central dome being 265 feet. Walls and piers are faced with marble of beautiful colors. The columns, made of the same material, have capitals of pyramidal shape covered with intricate interlacing designs. The flat spaces of the walls are covered with pictures in mosaic; these were whitewashed when in 1453 the Turks seized Constantinople and converted the temple into a Mohammedan mosque, but they have recently been restored.

The subjects depicted in Byzantine mosaics nearly all concern religion. Figures of Christ and the apostles and scenes of the Crucifixion, Ascension, and other episodes from the life of Christ and his apostles are common. They produce a striking effect, especially when seen from a distance, and brighten the large, dimly lit wall space. The figures appear rigid, but this stiffness fits well with the architectural surroundings. Such art is "didactic"; that is, it has the practical purpose of teaching worshipers the facts of the Christian religion and of stimulating devotion.

Paintings also were produced, representations of Christ, the Blessed Virgin, and other figures famous in Christian history. Small figures framed in gold and decorated with jewels, called *icons*, stimulated worship. Such pictures, when used as illustrations in manuscripts that demanded greater variation of theme than mosaics on church walls and icons for devotions, were called miniatures. Illustrating manuscripts had been practiced since the days when Alexandria was the center of learning. Through Byzantium, this art of the miniature passed to western Europe and became the parent of modern book illustration.

[1] DIEHL, CHARLES, *The Cambridge Medieval History*, Vol. IV, p. 767, The Macmillan Company, New York, 1923.

Byzantine art was a hybrid; elements were brought from neighboring lands and from the Byzantine provinces. Greek influences were the strongest and remained predominant. From Syria was derived the idea of covering the basilica with domes. From Mohammedan lands came the type of decoration composed of complicated arabesques and geometrical designs. From Persia and lands under Persian influence came the designs of conventionalized animal and plant forms. All these elements, strongly influenced by old Greek traditions, were employed to glorify the Christian faith, the highest philosophy of life among the

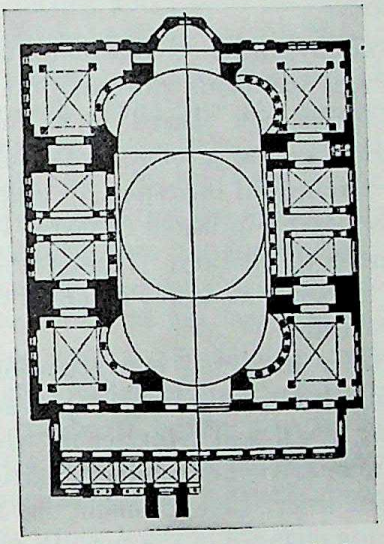


FIG. 53.—St. Sophia, ground plan.

Byzantines. "In the history of medieval civilization before the eleventh century, Byzantium played a role analogous to that of Athens and Rome in antiquity and to that of Paris in modern times. She illumined the whole world; she was 'the city' par excellence."

FOR FURTHER READING

BAKER, G. P.: *Constantine the Great*
———: *Justinian*
BAYNES, N. H.: *The Byzantine Empire*
———, and H. ST. L. B. MOSS: *Byzantium. An Introduction to East Roman Civilization*
BYRON, ROBERT: *Byzantine Achievement*
Cambridge Medieval History, Vol. IV
DIEHL, CHARLES: *Byzantine Portraits*
———: *History of the Byzantine Empire*
HARRISON, FREDERIC: *Byzantine History in the Early Middle Ages*
HUSSEY, J. M.: *Church and Learning in the Byzantine Empire*, 867–1185
RUNCIMAN, STEVEN: *Byzantine Civilization*
SYKES, PERCY: *A History of Persia*, Vol. I
VASILIEV, A. A.: *History of the Byzantine Empire*

Chapter XVIII

ARABIC[1] CIVILIZATION

The one condition for culture is a well-settled government; for such government alone is at once the basis of social order, of trade and commerce, and indeed of all national prosperity and well-being.—Joseph Hell

SIGNIFICANT as Byzantine civilization was during the Middle Ages, that of Arabian lands proved quite as important. For Mohammedan civilization shared more fully in Greco-Roman cultural traditions and became a more powerful agent of diffusion. Further, it was more resourceful in respect to original cultural creation than Byzantium. Its leadership lasted from the eighth century to the beginning of the fourteenth century. During these six centuries the civilization of western Europe was deeply indebted to the Mohammedans for much of its higher culture.

Arabia has repeatedly attracted our attention. Out of its vast desert areas came many Semitic-speaking peoples such as the Amorites, Assyrians, Phoenicians, Jews, and Aramaeans, who seized the Fertile Crescent. Although a reservoir of conquering tribes, Arabia did not exert much cultural influence, save through the Hebrews. This cultural barrenness suddenly changed in the seventh century, owing largely to the genius of Mohammed.

Geography of Arabia. First it is necessary to glance at the physical conditions of Arabia if we wish to understand the nature of Arabia's contributions. The interior was a desert of hot and shifting sands. Here and there were fertile spots, or oases, around springs where the date palm grew. Some parts, especially in the north, produced vegetation during fall, winter, and spring. To the north, from Palestine to the Persian Gulf, stretched the Fertile Crescent. Along the Red Sea coast was a strip of land suitable for agriculture. Its southern extremity was called Yemen; to the north lay the Hejaz. Here were the important cities of Mecca and Medina.

Social Conditions. The interior of Arabia was inhabited by wandering tribes ever on the move seeking grass for their flocks. Each tribe

[1] There is much confusion in the usage of the words "Arabian," "Arab," and "Arabic." For the sake of clarity, we shall call the people living in Arabia "Arabians" and those who speak the Arabic language and are Mohammedan in religion "Arabs" regardless of whether they are Arabians, Persians, Jews, Egyptians, or Berbers. The adjective "Arabic" applies to Arabs as well as to Arabians and often connotes Mohammedanism.

was a law unto itself, paying little attention to other tribes though often violently clashing with them. Practicing no agriculture until they established themselves in the Fertile Crescent and learned it from the culturally advanced peoples among whom they settled, they lived in tents that were quickly taken down and moved wherever their flocks might find grass. Such wandering Arabs were called Bedouins, or tent dwellers. In Yemen and the Hejaz, however, the Arabians had long ago abandoned their roving existence, adopted a settled mode of living, practiced agriculture, and carried on a sharp and active trade with Abyssinia and India. They also traded by caravans across the deserts with the flourishing centers of Syria and the Tigris-Euphrates Valley.

Grouped in petty tribes in the interior and small agricultural communities in the north and along the Red Sea coast, Arabians had no ordered society and enjoyed little peace. Lack of union had ever been characteristic of their past. Arabia was a geographical expression; there was an Arabian people, but no Arabian state. Nevertheless, in spite of local dialects there was a common language. In religion the Arabians were polytheistic, each locality being likely to have its special divinity. There were sacred stones, trees, springs, and wells. Essentially animistic in their religion, the Bedouins believed the desert wastes were peopled by spirits called *jinn*, or demons. There were sacred shrines; of these the Kaaba at Mecca (the most famous), adorned with images of many gods, was the object of pilgrimages. Arabians also believed in magic and fetishes, the Bedouins being particularly devoted to such conceptions. But everywhere along the fringes of Arabia foreign influences were at work modifying the old beliefs. Judaism was common in Yemen and the Hejaz. Christianity exerted a steady influence in these parts. Along the eastern parts of the Fertile Crescent, Zoroastrianism cast its spell.

Mohammed's Career and Teaching. The great achievement of Mohammed was to bring religious unity to Arabia. Because of his teaching, the medley of beliefs that had divided Arabians into a host of conflicting tribes and communities gave way to one universal belief in Allah, a monotheistic conception closely resembling the faith of the Jews. The new harmony produced a profound religious emotion; it united the discordant tribes who burst forth from the desert to conquer. Mohammed's career illustrates how a new religion may remake civilization and change the channel through which it must flow.

Born of poor parents, Mohammed was orphaned at an early age and brought up under the guardianship of an uncle. He evidently never received a formal education but while still a youth learned all there was to know about trade. Traveling far and wide, he became acquainted with the faiths of Jews, Christians, and Arabians and ques-

tioned the crude polytheism of the latter. When twenty-four years old, he married a wealthy widow named Khadija, with whom he lived happily, free to devote his time to religion. He had many visions while in contemplative trances, but this is not to be regarded as proof that he suffered from epileptic attacks. Out of this experience was revealed to him the teaching that there is but one God, almighty Allah, who created all things and commands that all men do right in order to win salvation. To disobey is to be cast into hell on that awful day of judgment which Mohammed taught was at hand.

Mohammed spoke like the ancient Hebrew prophets. The righteous were commanded to observe certain religious practices. After purifying themselves ceremonially with water or sand, they were required to pray with face turned toward holy Mecca. They were to fast every day in the month of Ramadan, eating and drinking being permitted only at night. Giving of alms was a noble duty and won favor in the sight of Allah. Visiting Mecca was meritorious, and one such pilgrimage was enjoined upon each follower of the Prophet. Predestination was a cardinal tenet. To gain paradise, each person was required to submit to Allah. Such submission was called "Islam."

Mohammed borrowed much from Judaism and Christianity. He accepted the Old Testament, holding that the Arabians had sprung from Ishmael just as the Hebrews had sprung from Abraham's other son, Isaac. Allah had spoken through such Hebrew prophets as Abraham, Moses, and Isaiah. Jesus also was a prophet, but not "very God of very God" as the Christians believed. So staunch was his monotheism that Mohammed thought the Christian faith had polytheistic elements in its Trinity. Hebrew prophets had told of the ways of God, but their testimony was concluded by his own, which had final authority. "There is no God but Allah, and Mohammed is his prophet!"

The Koran, or "Reading," is the sacred book of the Mohammedans containing the revelations of the Prophet. Originally these were written on palm leaves, stones, and bones. After the Prophet's death, they were collected and arranged in chapters called *suras*, the longest and most important being placed first, the shortest at the end. Readers find these hard to understand because each sura has little relationship with those which precede and follow.

Mohammed was a great poet. His artistry and poetic imagery indicate an understanding of Arabic life that few possess. Regarding the Koran, he wrote as follows:

> Read! in the name of thy Lord who created;—
> Created man from clots of blood:—
> Read! For thy Lord is the most beneficent,
> Who hath taught the use of the pen;—
> Hath taught man that which he knew not.

And of Allah:

Praise be to God, Lord of the Worlds!
The compassionate, the merciful!
King on the day of judgment!
Thee *only* do we worship and to Thee do we cry for help.
Guide Thou us on the right path,
The path of those to whom Thou art gracious;
Not of those with whom Thou art angered,
Nor of those who go astray.

The following verses are autobiographical:

By the noon-day brightness,
And by the night when it darkeneth!
Thy Lord hath not forsaken thee, neither hath he hated thee,
And surely the future will be better for thee than the present,
And thy Lord shall assuredly be bounteous to thee and thou be satisfied.
Did He not find thee an orphan and provide thee a home?
And He found thee erring and guided thee,
And found thee needy and enriched thee.
As to the orphan therefore wrong him not;
And as to him that asketh of thee, chide him not away;
And as for the favors of thy Lord, tell them then abroad.

The sura on *The Chargers* is one of Mohammed's noblest passages:

By the panting chargers!
And those that dash off sparks of fire!
And those that scour to the attack at morn!
And stir therein the dust aloft!
And cleave therein their midway through a host!
Truly, man is to his Lord ungrateful,
And of this he verily is himself a witness;
And truly he is vehement in the love of this world's good.
Knoweth he not, then, that when that which is in the graves shall be torn forth,
And that which is in men's breasts shall be brought out,
Verily their Lord shall on that day be well informed concerning them?

Concerning the resurrection, Mohammed said:

I swear by the resurrection,
And I swear by the self-accusing soul [Adam].
Thinketh man that We cannot reunite his bones?
Aye! his very finger-bones are We able evenly to replace.
But man chooseth to go astray as to his future.
He asketh, "When this day of resurrection?"

When then the eyesight shall be dazzled,
And the moon shall be darkened . . .
On that day man shall cry, "Where is there a place to flee to?"
But in vain—there is no place of refuge—
With thy Lord on that day shall be the sole asylum.
On that day shall man be told of all that he hath done first and last;
Yea, a man shall be the evidence against himself;
And, even if he put forth his pleas . . .
On that day shall faces beam with light,
Outlooking towards their lord;
And faces on that day shall be dismal,
As if they thought that some calamity would therein befall them.
Assuredly when the soul shall come up to the breastbone,
And there shall be a cry, "Who is the magician to restore him?"
And the man feeleth that the time of his departure is come,
And when one leg shall be enlaced [that is, in pain] with the other,
To thy Lord on that day shall he be driven on;
For he believed not, and he did not pray,
But he called the truth a lie and turned away,
Then, walking with haughty mien, rejoined his people.
Thinketh man that he shall be left uncared for?
Was he not a mere embryo?
Then he became thick blood of which God formed him and fashioned him;
And made him twain, male and female.
Is not He powerful enough to quicken the dead?

The Prophet found that men would not believe in his mission. His strict monotheism interfered with their ideas; his puritanical morals galled them. Some of his family accepted the new teaching, but in 622 Mohammed was forced to leave Mecca. This was the *Hegira*, or flight, and marks the first year of a new era from which Mohammedans still reckon time. The Prophet took up his residence in near-by Medina, "City of the Prophet." There he founded a community of faithful followers who zealously submitted to his direction and loyally espoused his feud with Mecca. After much fighting, Mohammed seized Mecca in 630; thenceforth, the Kaaba there became the holiest shrine of Mohammedanism, the objective of all devoted pilgrims. His enemies now submitted to him; even some of the Bedouins embraced the new faith. Mohammed served as prophet, gave religious advice, sat in judgment over his followers, led his army, and acted as head of the state. In this way a religious society was formed that at the same time constituted a kind of state. In 632, Mohammed died after extending his authority over the Hejaz.

The Caliphs. The caliphs, or successors of Mohammed, of whom the first were chosen from among his more intimate associates, con-

tinued the work of the Prophet, assumed leadership in prayer, led pilgrimages, carried the standard of the Prophet, and commanded the warriors. The early caliphs, however, never attempted to develop an elaborate political organization. The first four caliphs were "orthodox" because it was believed they followed Mohammed's teaching more faithfully than the succeeding Ommiad and the Abbasside caliphs. The orthodox caliphs were abu-Bekr (632–634), Omar (634–644), Othman (644–656), and Ali (656–661). Abu-Bekr united the Bedouins of the interior under the Prophet's standard. Omar began a military offensive against Byzantium and Persia, which, exhausted by their long and bitter wars, were unable to resist the fanatic cavalry and camelry of the desert. Palestine was taken in 637; Egypt in 640. The empire of the Sassanids foundered in the fateful Battle of Nahavand in 641, and in 658 all Persia was in Arab hands. The sway of the caliphs now extended eastward as far as the Indus Valley.

But feuds and dissensions divided the Arabians. The orthodox caliphs aimed to subordinate the newly conquered to Arabian rule. Some of their own party objected to this policy. Thus Mo'awiya led a group known as the Syrian party, refused to accept the domination of the Arabs, and engaged in a feud with the orthodox caliph. Finally, in 661, Ali was assassinated, and the orthodox caliphate came to an end. Mo'awiya established his capital in old Damascus, which thereupon became a flourishing metropolis. He founded the Ommiad line, which ruled undisturbed until 750, when abu-l-Abbas-Abdallah, a descendant of the orthodox caliph Ali, overthrew the usurping Ommiads. The new movement was based upon Persian opposition to the Ommiad authorities. Just as the Ommiad caliphs had objected to exclusive dominance by Arabians, so the Abbassides, as the followers of abu-l-Abbas-Abdallah were called, objected to the policy of the Ommiad caliphs, who had favored the Syrians. The Abbasside caliphate in turn established its capital at Bagdad; here it lasted until 1258, when it succumbed to the invasions of the Mongols under their khan Hulagu.

Character of the Arabian Conquests. Western people usually misunderstand the character of the Arabian conquests. These remarkable military successes are supposed to be due to a ferocity that cowed all opposition. The Arabs offered the conquered, it is said, the choice of the Koran or the sword. The truth is that the Arabians did not exterminate Christians. They merely exacted a special tribute from them, the followers of Mohammed being exempt from this tax. The Bedouin warriors, who looked with envious eyes upon the possessions of the agricultural peoples of the Fertile Crescent, found it profitable to levy tribute upon them. The economic motive undoubtedly was an overpowering impulse, and in this respect the Arabic expansion is char-

acteristic of the excursions of Semites as far back as the times of the Babylonians and Assyrians. But religion also was an important factor, for it provided spiritual unity for the Arabians. Without this religious unity the Arabs would never have been able to effect their conquests.

Moreover, a remarkable change swept over Arabian civilization during Ommiad times. Hitherto, the Arabians had dominated the new state through the caliphs. But soon large numbers who were not of Arabian stock began to embrace Islam and intermarried with Arabians. Hence, the Arabian people became mixed with Syrians, Jews, Egyptians, Berbers, and even Greeks, and a new people, composed of the most diverse elements, came into existence. Because Islam was the binding religious element, the Koran became the basic book of this new civilization. To read it—and reading this book was required of every follower of the Prophet—all had to know Arabic. Consequently, the Mohammedan world became a melting pot of diverse peoples held together by the Koran and the Arabic language. This new civilization is called "Arabic." Under the Abbasside caliphs, Arabic civilization underwent its most characteristic changes. The already marked international aspect of Arabic society became even more international by amalgamation with Persian and Hindu elements.

The Arab State and Its Effects. What sort of state did the Ommiad and Abbasside caliphs produce, and how was it governed? At the beginning of their conquests the Arabians for the most part were desert dwellers who knew nothing about ruling the complex societies of the Tigris-Euphrates Valley, Persia, Syria, and Egypt. Their own tribal organizations suddenly becoming antiquated, they took over the governmental institutions of the lands they conquered, particularly Byzantium and Persia. They even appointed Persians, Byzantine Greeks, Jews, and Syrians to important posts, though as a precaution the Ommiad caliphs placed trusted Arabians over them. The Abbasside caliphs, however, appointed non-Arabians to positions of trust. At the head of the Arab state stood the caliph, the elected or hereditary successor of the Prophet and leader of the government, the source of all power. But he was not Mohammed's successor in religion, for the Prophet had no religious successor—his word was final. It was the duty of the caliph to defend the faith and promote worship, but in no wise did he function as does the Pope of the Christian church.

The Abbasside conquests were stirring events, for never before had the lands of the Indus Valley, Persia, Turkestan, the Fertile Crescent, Palestine, Arabia, Egypt, northern Africa, and Spain (conquered in 711) been united under the sway of one ruler. Peace and order characterized the life of this state. Trade developed; wealth and comfort resulted. Great cities sprang up. Ancient places that had long been famous as

Greco-Roman centers of culture enjoyed unusual prosperity. The Abbasside caliphate was perhaps the most prosperous period mankind had yet known.

Halfway up the Tigris, Bagdad was advantageously situated to become the economic as well as the political capital of the Abbasside caliphate. Founded in 750, it speedily became one of the world's greatest cities. Upon it converged trade from East and West. Here were manufactured fine cloths, rugs, silks, jewels, steel weapons, and gold and silver objects. Bagdad became rich, and its population reached a million; it was as large as Constantinople and surpassed it in wealth and luxury. Other cities were also bustling centers of trade. To name but a few, Basra at the very head of the historic Persian Gulf was the terminus of the water route to India, Ceylon, and the East Indies; El Mansura guarded the land route to India; Samarkand and Bokhara were stations on the road to China; Damascus was the thriving industrial and commercial center in Syria on the road from Bagdad to the Mediterranean; Cairo and Alexandria led the economic life of Egypt; and Kairouan in Tunis was the focal point of caravan trade for all of northern Africa.

Commerce. The lands of the caliph occupied a central geographical position particularly favorable to the economic life of the time. Moreover, the advanced character of Arabic civilization together with the constant urge to visit Mecca stimulated travel and promoted commerce. Choice products of the Far East passed through the Tigris-Euphrates Valley to Byzantium and the Christian West. The "great silk way" ran through Samarkand and Chinese Dungaria, a region through which present-day man hardly ever travels. The Caspian Sea was the scene of much commercial activity because of the prosperous trading centers of Bokhara and Samarkand to the east. Ramifications of this commerce extended up the Volga and Dnieper rivers. Arabic coins have been found in Scandinavia, Germany, and Russia. Although Arabic traders had comparatively little success in the Mediterranean region, they were active in Egypt, northern Africa, and Spain. They also traded with the East Indies, especially the Moluccas, or the Spice Islands. Arabic merchants exported dates, sugar, articles of steel, glassware, and cotton and woolen goods. They imported silks, spices, camphor, and aromatic gums from the East and ivory, ebony, and colored slaves from the African West.

Agriculture, Horticulture, and Gardening. Agriculture throve under the caliphs. Because Mesopotamia was densely populated, its soil was intensely cultivated by methods that had proved successful since Sumerian days. The country was carefully irrigated by innumerable ditches and dams. Arab farmers understood the value of manure

and of letting the ground lie fallow. Gardening and horticulture were better developed than in any European lands of the time. Many products were manufactured from plants totally unknown in the West. Sugar was made from sugar cane, of which great quantities were grown in Khuzistan. Oranges, not cultivated in Europe, were produced in abundance. Persia manufactured attar of roses and other perfumes. Cotton, hemp, and flax were raised. It was by Arabian diffusion that a large number of plants passed into Europe, some by way of Sicily and Italy, others through Spain. The date palm was introduced into Spain and Portugal; rice and buckwheat were brought to Italy; oranges, lemons, apricots, peaches, and a large variety of flowers including the morning-glory were brought into Europe. The introduction of so many new plants and new methods of agriculture exerted a profound effect upon European life.

INDUSTRY: PAPER AND GLASS. The unification of lands between the Indus and the Nile valleys had a stimulating effect upon industry. The connection with China by way of Dungaria enabled Arabs to learn the secret of the manufacture of paper. This article was also produced at Samarkand, and by 800 there was in operation a paper mill in Bagdad. Gradually this industry passed to Egypt (900), Morocco (1100), Spain (about 1150), and finally to Sicily. Paper of the highest quality was produced, which put an end to the ancient papyrus and parchment industry. Glassmaking flourished. Syria was the center of this industry, inherited from ancient Phoenician days. Glass of great clarity and unusual thinness was manufactured. Enameled and variegated glass was produced and proved so popular that a lively demand for it sprang up. Glazed tiles, metal vases, plate glass, crystal, and mosaics were also manufactured.

Occupying a central position between Orient and Occident, the Arabs were able to sell their superior textiles to other peoples. They wove the finest silk cloths from silk brought from China. Striped cloth called *tabi* (tabby) (from Attab, a quarter of Bagdad, where it was manufactured) was prized in Christian lands. Taffeta, a fine silk cloth produced in many places, was in great demand. In addition, the Arabs made excellent cotton and woolen cloths, brocades, and sofa covers. Oriental rugs came from Persia and many other parts of the Arab world; Bokhara was noted for its prayer rugs.

In a society so luxurious as that of the Arabic world the jeweler's art was bound to reach high perfection. The upper classes, being especially fond of diamonds, emeralds, rubies, pearls, and sapphires, displayed them lavishly. But less expensive stones like onyx, turquoise, carnelian, lapis lazuli, azurite, and marble were also used, especially in furnishings.

Regarding its material aspects—commerce, industry, and agriculture—Arabian civilization was superior to that of contemporary western Europe. This is true also in respect to art, science, medicine, philosophy, and learning in general. The Arabs when they emerged from the desert as conquerors had few intellectual achievements to give the world. But the moment they conquered Mesopotamia, Persia, Syria, and Egypt they came in contact with greatly advanced civilizations. The ancient intellectual life deeply entrenched in the conquered lands continued unhindered. Often, Persians, Jews, and Christians became Mohammedans and could hardly be distinguished from genuine Arabs. The great prosperity of the caliphate at Bagdad stimulated a learning and scientific activity based upon Aristotle, Hippocrates, Euclid, Galen, and Ptolemy. The Arabs also borrowed from Hindu writings, with significant consequences, as we shall discover.

Translations from the Greek. Arabic science began to flourish under the Abbasside caliphs. The Ommiad caliphs had distrusted all who were not Arabs, and subject peoples therefore had had little chance to make their influence felt. But the Abbasside caliphs drew their support largely from Jews, Christians, and Persians. In this tolerant society there was much interest in science. Translations were made from Greek originals. Mamun, caliph from 813 to 833, carried this zeal for Greco-Roman science to great lengths and in 830 established an institution of study and research in Bagdad, copied no doubt after the ancient Museum of Alexandria. It was called the "House of Wisdom" and contained a library, an academy, and extensive quarters for the purpose of making translations. Though exceedingly rich in its poetic imagery, the Arabic tongue was poorly equipped for this scientific work owing to the fact that the Arabians were a desert folk to whose culture the philosophic and scientific labors of the Greeks were quite foreign. Hence, many scientific and scholarly words were borrowed directly by the Arabic from the Greek. Thus, *arithmetica* became *arithmatiqi*, *geometria* became *jumatriya*, *philosophia* became *falsafah*, and *musica* became *musiqi*.

The greatest of Arab translators was Hunain ibn-Ishaq (809–873), who visited Greek-speaking lands and collected manuscripts. Under Mamun, he was placed in charge of the work of preparing translations. He was a Christian, a fact that reveals the remarkable tolerance prevailing under Abbasside caliphs. He and his assistants translated into Arabic the works of Hippocrates, Galen, Dioscorides, Plato, and Aristotle and the Old Testament (the Septuagint). Hunain's name deserves to be held in honor by all who are interested in learning. Euclid's *Elements* and Ptolemy's *Almagest* were translated, it is believed, by Al-Hajjaj (*d.* before 833). Practically all the scientific, medical, and philosophic

writings of the Greeks were finally made available to Arab-speaking people.

This scientific and scholarly activity was of the utmost importance in intellectual history, for western Europe had lost almost all direct acquaintance with Greek learning. So great was the decline in scientific scholarship among Europeans that few of them were aware of the works of the ancient masters. Thus Arab scholars preserved Greek learning during the Dark Ages until western Europe was ready to resume scientific study and could draw upon the intellectual stores of the Arabs.

Original Scientific Scholarship. Arabic scientific scholarship was not limited to the copying of Greek manuscripts and the perpetuation of Greco-Roman science; remarkable additions to this scientific knowledge were also made. Thus Hunain ibn-Ishaq produced a work on opthalmology, the *Ten Treatises on the Eye.* Ali Al-Tabari, a Christian, produced his *Paradise of Wisdom* in 850, one of the first encyclopedias of practical medicine. A remarkable section of this work deals with dentistry; the writer discusses diseased gums, caries, and cavitation, advocates extraction, and recommends the use of tooth powders.

There were many great physicians and medical scholars, but of them all Rhazes (*d.* 923), a pupil of Al-Tabari, most deserves mention. He was a Persian who mastered the medical lore of the Greeks and supplemented it with observations of cases in hospitals. Among his works is an encyclopedia known as the *Continens* because it contained the entire subject of medicine. This book was immensely popular in Europe during the Middle Ages. Rhazes also produced a smaller work called *On Smallpox and Measles.* Although this book fails to distinguish between the two maladies, it contains many exact descriptions drawn from clinical observation. Rhazes also wrote a treatise on dentistry. He understood the effects of malnutrition, warned against the accumulation of tartar, and studied the condition called dry-socket. He studied caries and advocated the filing away of decayed parts and filling the hollow teeth with some metal. Another medical master was the Persian Avicenna (*d.* 1037), who produced an encyclopedia of medicine, the *Medical Canon*, which also served as a pharmacopoeia.[1]

Progress in anatomy was slow, for the Mohammedans had scruples against dissection. But the Arabs made sane hygienic regulations and developed practical medical institutions. They had good apothecary shops and even established a school for the study of pharmacology. Druggists were required to pass a test. Doctors were ordered to present themselves for examination, and a system of state certification was

[1] For the dental studies of Al-Tabari and Rhazes, see *Journal of the American Dental Association and Dental Cosmos*, Vol. XXIV, pp. 1847–1852, 1937. Another article in the same volume (pp. 944–955) deals with the general dentistry of the Arabs.

established to eliminate quacks. Hospitals and clinics were plentiful, were provided with libraries, and in some cases offered instruction in medicine.

PHILOSOPHY. The philosophy of the Arabs derived mainly from Plato, Aristotle, and the teachers of Neoplatonism, supplemented by ideas drawn from the Koran and from Persia and India. Avicenna followed in the footsteps of Aristotle. Al-Kindi (*d.* about 873) adopted the point of view of Plato and studied Aristotle through Platonic eyes. He was a scientist, a translator, and the author of an astounding number of books. Averroes (1126–1198), who spent his life as a teacher in Spain, wrote commentaries on the works of Aristotle and was Aristotelian in his attitude. He also produced a commentary on Ptolemy's *Almagest.* Averroes's works stimulated the philosophic and scientific revival in western Europe that began in his day and resulted in Scholasticism.

EXACT SCIENCE. The Arabs were also interested in exact science, in fact, in every branch of natural science developed by the Greeks. Edrisi (*d.* 1166), a geographer and cartographer, made a planisphere of silver. Al-Khowarizmi (*d.* in the ninth century) was an important master of algebra and arithmetic; his treatment of quadratic equations is classic. There were other scholars, too numerous to mention, who studied optics, physics, metallurgy, and biology.

DEFECTS OF ARABIAN SCIENCE. Because they followed in the footsteps of ancient scientists and medical men, Arab students made as many mistakes as the Greeks had. They accepted the ideas of Ptolemy, who held that the earth is the center of the universe and that the planets revolve around it. They also accepted the lore about the zodiac and the influence that stars were believed to exert. Following Galen, they believed that the human body is composed of the four humors. Belief in astrology, alchemy, and magic continued, and Arabic science rarely detected its own errors. When western Europe took over this vast body of learning, it received basically erroneous doctrines, from which scientists only slowly freed themselves. On the other hand, Arabian scholars sometimes criticized the Greeks and improved upon their work, Al-Kindi, for example, daring to hold that alchemy is a false science.

ARABIC NOTATION. The Arabs apparently received from the Hindus a special series of nine characters that proved a great boon to all who studied mathematics or made practical use of it. These are the numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9. The figure 0 seems to have been invented by the scholars of India and not by the Arabs as is usually asserted. Further, the Hindus gave a value to every place in a number. For example, the value of 8 depends upon its place. In 800, its value is ten times as great as in 80; in 80, it is ten times as great as 8. Another custom of the Hindus was to use the figure 0 for a vacant number; thus,

the number for the sum ten thousand twenty-five is 10,025. Here the figure 0 employed twice is a symbol for two vacant numbers. Nevertheless, its position in the number gives it a positive value.

These devices had immense practical consequences, for they facilitated computation. Many methods of counting and of indicating numbers were invented in the Neolithic and Bronze ages, but most of them disappeared. The Greeks and Romans used awkward systems of letters that stood for numbers. They had no idea of position, nor did they possess the useful device of the figure 0. Roman numerals were gradually supplanted by the Arabic numerals introduced into Europe about the year 1000. The Roman method of writing numbers continued in use, however, in western Europe through medieval times.

Education. Education was given importance among the Arabs. Basic instruction was in the Arabic tongue, the language of the Koran. Because this work contained the true doctrine regarding man's purpose and destiny, pupils were encouraged to commit as much of it to memory as possible. Such religious instruction was for girls as well as boys. Grammar, reading, penmanship, arithmetic, and poetry were emphasized in the elementary schools.

Higher education was not nearly so common as elementary education. The House of Wisdom founded in Bagdad by the Caliph Mamun, as we have stated, was modeled on the Museum of Alexandria. Here were studied the sciences inherited from the Greeks. Theological instruction was given in other institutions, but the mosques were really the educational centers, for there many an Arab learned to read the Koran. Theological discussions were common. Libraries were plentiful in the larger cities, especially Bagdad. Here also were bookshops in which translations from the Greek, the literary works of Persia, and the Koran itself were offered for sale. The result of this intellectual and educational activity was that a class of highly educated Arabs came into existence under the Abbasside caliphs. Such intellectual cultivation hardly reached the lower classes, who at best were able to read little more than the Koran.

Mohammedan Art. Like other aspects of Arabic civilization, Mohammedan art was derived in part at least from the conquered peoples living under the caliphs. Syrian, Byzantine, Persian, Egyptian, and Roman elements were present, but the religious ideas of Mohammedanism dictated the way in which they were employed. The early Arabians had to rely upon conquered peoples for the kind of buildings they needed and the decorative designs to be used. They learned to use smooth columns, capitals, arches, and particularly the horseshoe arch. The principle of the vault was employed, especially in the larger mosques. The dome was copied from Syrian and Byzantine architecture.

Mosques were perhaps the most characteristic of Arabian buildings. These are temples specially designed for Mohammedan worshipers. The first mosques built in Syria were simple, having vaulted roofs, aisles formed by columns, and niches on the side facing Mecca. The hall was a place where the kneeling devout worshiped, with faces turned toward Mecca. The mosque of Omar in Jerusalem is octagonal, its

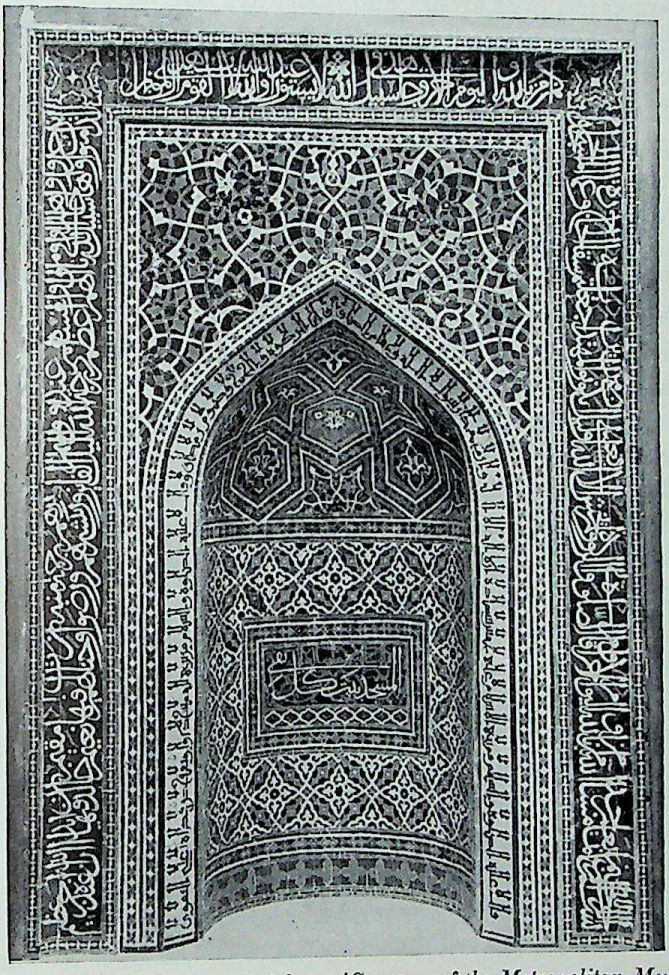


FIG. 54.—Persian *mihrab*, or prayer niche. (*Courtesy of the Metropolitan Museum of Art.*)

large dome resting on an inner circle of columns and arches. The ideas employed in this building, constructed about 700, were borrowed directly from Byzantium. The mosque of Damascus, like most mosques built at this time, consisted of a large open space surrounded by a colonnade. The idea of using columns and arches obviously was drawn from Roman architecture. Lofty towers, called minarets, surrounded by balconies were common. From them the muezzin, or crier, called the devout to prayer.

The Koran forbids artists to represent living beings, human or animal. For this reason, Mohammedan painting and sculpture never exhibited the brilliant variety that characterized Greek and Roman art. In one form, however, Mohammedan masters showed themselves inferior to none—geometrical design in decoration. Because there was no religious objection to this, interlaced patterns of the greatest intricacy appeared over arches and doorways and on the walls of rooms. Natural and conventionalized flowers and plants were employed, as well as texts from the Koran, and their decorative effect was most striking. Arab craftsmen successfully used such designs in carving wood, stone, and ivory. In fact, everything they produced—brocade, silk cloths, carpets, tooled leather, pottery, glass objects, steel and brass articles inlaid with gold and silver, or decorated steel objects—possessed extraordinary beauty.

Arab Literature. In addition to the Koran, the Arab world produced other noteworthy literature. Apparently little interested in Greek literature, they drew their literary inspiration largely from Persia. Omar Khayyám's *Rubaiyát* has won a secure place among the world's greatest literary works. The author (*d.* 1123), a Persian long known chiefly for his studies in mathematics and astronomy, viewed nature through the eyes of a scientist and seems to have been an agnostic, believing that what men know is merely relative and uncertain and that no knowledge of God and the ultimate purpose of man and the world can be obtained.

Life seems pathetically transient to Omar, and its fondest hopes are vain.

> The Worldly Hope men set their Hearts upon
> Turns Ashes—or it prospers; and anon,
> Like Snow upon the Desert's dusty Face,
> Lighting a little hour or two—is gone. . . .
>
> When You and I behind the Veil are past,
> Oh, but the long, long while the World shall last,
> Which of our Coming and Departure heeds
> As the Sea's self should heed a pebble-cast. . . .
>
> We are no other than a moving row
> Of Magic Shadow-shapes that come and go
> Round with the Sun-illumin'd Lantern held
> In Midnight by the Master of the Show; . . .

And the days that have passed can never be brought back.

> The Moving Finger writers; and, having writ,
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a Line,
> Nor all your Tears wash out a Word of it.

Philosophical and theological arguments do not comfort the poet.

Myself when young did eagerly frequent
Doctor and Saint, and heard great argument
About it and about: but evermore
Came out by the same door wherein I went.

Omar Khayyám protests against man's hard fate, which dooms all things to early death. Passionately he praises life's joys, loves, and friendships.

A Book of Verses underneath the Bough,
A Jug of Wine, a Loaf of Bread—and Thou
Beside me singing in the Wilderness—
Oh, Wilderness were Paradise enow!

Another masterpiece, the *Arabian Nights*, has delighted a host of readers. These tales were drawn from Indian, Persian, Egyptian, and Arab sources. Their background is the social, economic, political, and religious life of the Abbasside caliphate and the culture of Bagdad. The *Arabian Nights* introduces the reader to the civilization of the Arabs at a moment when it was richer and more refined than Christian life in western Europe. Many tales such as those of *Ali Baba and the Forty Thieves* and *Sindbad the Sailor* have never been surpassed.

Arabic Spain. The high attainments of the Arabs in Spain were important for the culture of Christian Europe, especially after the tenth century. Following the conquest in 711, the Ommiad rulers introduced Arabic thought and industry into Spain. The backward and provincial character of Spanish life thereupon changed rapidly as the people adopted the superior culture of the Arabs. Cordova, Toledo, and Granada became flourishing centers from which Arabic culture was diffused to France, Germany, and other lands of Christian Europe. Population increased, towns gained in size, and public wealth grew by leaps and bounds. Weaving flourished; Cordova is said to have had as many as thirteen thousand weavers. Leather work was developed to great perfection. In English we sometimes call a shoemaker a "cordwainer," a word borrowed from Cordova. The proper noun "Corwin" also is derived from it. We still call a certain kind of leather "cordovan." In French a shoemaker is called a *cordonnier*. Arabic metallurgy also flourished, damascene art developed, and Toledo swords became famous. Gold, silver, and brass articles were in great demand.

The Arabs transformed rural Spain by bringing in new methods of cultivation, especially irrigation. They introduced peaches, apricots, pomegranates, oranges, rice, saffron, cotton, and sugar cane, besides many varieties of flowers. This flourishing agriculture stimulated commerce, and thus Málaga and Almeria became thriving centers of export

trade. The number of nautical terms introduced into the language of western Europe from the Arabic attest to the extensive shipping interests of the Arabs on the Mediterranean. Among these words in English are admiral, tariff, and average (that is, duty on goods). Manufactured goods were exported to other parts of Europe, and some Spanish goods even found a market in Mecca, Bagdad, and Damascus.

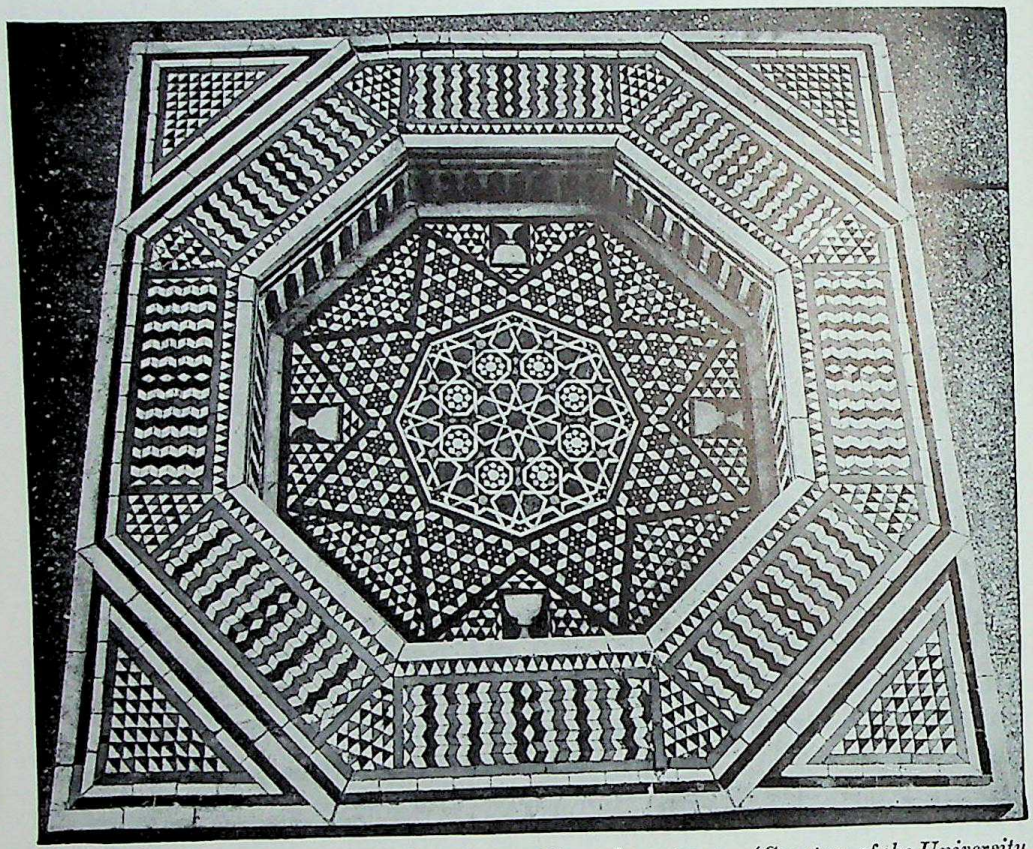


FIG. 55.—Mosaic fountain from a Cairo house, fifteenth century. (*Courtesy of the University of Pennsylvania Museum.*)

Particularly important were the intellectual contributions of Spanish Arabs. The learning of the Abbasside East found a favorable home in Cordova and Toledo; Greco-Roman learning was as well understood there as in Bagdad. Translations were made from the works of Greek writers; and original Arabic works in philosophy, science, and medicine were studied. Later Arabic scholarship was to find its way from Spain into Christian Europe, but not until the twelfth century.

Heirs of Greco-Roman civilization, the Arabs absorbed Persian, Indian, and other elements. By adding their own contribution, they created a rich and complex culture that was destined to exert wide influence in Asia, Europe, and Africa, especially after the founding of the

Abbasside caliphate. As we shall learn, this became a powerful transforming force in medieval life and thought.

FOR FURTHER READING

ARNOLD, T. W., and ALFRED GUILLAUME (ed.): *The Legacy of Islam*
BARTHOLD, W.: *Turkestan down to the Mongol Invasion*
DAWSON, CHRISTOPHER: *The Making of Europe*
DIBBLE, R. F.: *Mohammed*
HELL, JOSEPH: *The Arab Civilization*
HITTI, P. K.: *History of the Arabs*
LEVY, REUBEN: *A Baghdad Chronicle*
MARGOLIOUTH, S. D.: *Mohammed*
MOSS, H. ST. L. B.: *The Birth of the Middle Ages*, 395–814
O'LEARY, DE LACY: *Arabia before Mohammed*
———: *Arabic Thought and Its Place in History*
SMITH, D. E., and L. C. KARPINSKI: *The Hindu-Arabic Numerals*
THOMPSON, J. W.: *Economic and Social History of the Middle Ages*, 300–1300, Chaps. VII, XV, and XXII
TOTAH, K. A.: *The Contribution of the Arabs to Education*

Chapter XIX

FOUNDATIONS OF MEDIEVAL CULTURAL UNITY

The papacy has succeeded in developing the most interesting political institution in the history of the world, and to ignore it or thrust it into an appendix is to misconceive the evolution of a thousand years.—J. N. Figgis

MEDIEVAL civilization—the unique achievement of the Celtic, Germanic, Slavic, and nomadic populations of Europe—occupies an impressive place in history. It derived material and intellectual inspiration from Greco-Roman, Byzantine, and Arabic sources, and thus its foundations were securely laid by the creators of those civilizations. Its spiritual temper was drawn from the truths of the Christian religion, which became universally accepted during these centuries. Impregnated with the principles of a lofty morality and a system of universal ethics, medieval life and thought revealed the far-reaching power of religion in the creation of a civilization possessing its own art, literature, philosophy, and institutions.

State of Society in Western Europe. Western Europe long suffered from the disasters of the late Roman Empire. Economic activity languished, and the old city-states steadily disappeared. Life was predominantly rural, dependent upon agriculture. We have seen that the Roman agricultural estate succeeded the free farms of the municipalities and that colons, predecessors of the medieval serfs, took the place of the free cultivators. "Money economy" tended to disappear, and a "domestic economy," or "agrarian economy," became more common. As there was little buying and selling, foodstuffs and manufactured articles had slight value. Each estate, regardless of size, raised all or nearly all that was needed to maintain the activities of its population. What surplus food or goods was produced might be exchanged for wine, olives, salt, or iron, if the estate possessed none of these. Such was the condition of society in Spain, Gaul, Italy, and the Rhineland. People lived in small communities economically self-sufficient. In England, Germany, Poland, Hungary, and elsewhere the large agricultural estate appeared only gradually after 800.

Seigniors, or lords, owned such estates and transmitted them to their heirs from generation to generation, thus creating a series of petty dynasties. Survival depended on a land economy, cultivation of the surrounding acreage; thus, the lord reserved certain parcels for the main-

tenance of his household, which included his family and their immediate retainers. Other parcels belonged to the serfs and a few freemen, usually skilled in some petty craft. The serfs tilled all the land but were entitled to the produce of their own allotments, subject to certain assessments or emergencies. For the convenience and safety of the economic unit, the serfs' houses were grouped around the lord's house, barns, smithy, mill, and wine press.

The Christian Parish. Into the rural economy of the Dark Ages the Christian parish fitted easily, and by the tenth century it was an accepted part of the feudal estate. The seignior provided for the church by setting aside certain lands that were tilled by or for the parish priest. Originally in many cases attached to the local pagan temple, they became the permanent endowment of the church. The parish church and churchyard everywhere became part of the buildings that rose around the seignior's house and barns, an arrangement that long remained a typical feature of medieval villages. The seignior retained the right of "presenting" someone to the bishop for appointment to the post of parish priest. The bishop usually accepted the candidate if fit, whereupon in due time he was "invested" with his responsibilities. The priest belonged to the estate and at times was a serf who could hardly read or write.

Episcopal Organization. The episcopal organization was quite different from that of the parish. The area over which a bishop ruled comprised many parishes and was called the diocese. A corps of assistants was needed to supervise the parishes. This was expensive but feasible because bishops received as gifts many estates with serfs attached. At Rome, for instance, pious folk deeded their estates to the church out of affection for St. Peter, who had suffered martyrdom in Rome. In this way the bishop of Rome early became a great landlord owning wide estates from the income of which he maintained his own church, supported the organization needed to supervise the religious life of his diocese, and engaged in charity. As in the case of the seigniors, the espicopal management rested on domestic and to a very small extent on money economy.

Remnants of Paganism and Superstition. What was the nature of the faith of the people in the Dark Ages? In answering this question, we must bear in mind that the Christian church was born into a cultural complex which had long been in existence. The Roman state had a complicated organization. Pagan religions had a venerable past. Both were entrenched in the popular affections and deeply influenced conduct. From its beginning the Christian religion insisted on certain ethical practices and on a special attitude toward the world. Before the Edict of Milan in 313, Christians were a submerged group living austerely and uprightly. After this edict, Christianity became a favored religion and unworthy people sometimes joined its ranks because it was good policy.

By the time of the Emperor Theodosius' death in 395, all Romans had been made Christian by law; every other form of religion was declared illegal. Thus, at the opening of the Middle Ages, people living in the lands of the Roman Empire were traditionally Christians, being baptized into the faith. The church was universal, or, to use another word with the same meaning, catholic. However, at the fringes of the empire and indeed within it were the barbarians, only recently converted or still clinging to paganism and pagan rites.

The Christian church could not stamp out suddenly the multitude of such practices. Although the church successfully conquered opposing cults such as those of Mithras, Isis, Cybele, and the gods of Greece and Rome, it could not eradicate all ancient superstitions; magic was still prevalent. The serf had a store of formulas and rhymes to make crops grow, prevent pests from destroying his cattle, and keep harm from his family. People also believed in witchcraft, thinking the devil's aid could be enlisted in harming one's neighbors. Such conceptions and beliefs—which were foreign to Christian teaching—continued through the Middle Ages and until our own time. Even today occasional witchcraft murders occur despite modern scientific teaching.

How such ideas persisted is seen in the methods whereby German invaders sought to prove the guilt or innocence of a person accused of crime or misdemeanor. The method of the ordeal rested upon the belief that men prefer to confess evil deeds rather than to invite divine wrath. The accused proved his innocence in one of a number of ordeals such as those by hot water, cold water, and hot iron, by eating a morsel consecrated by a priest, and by combat. Upon conversion, the barbarians dropped the old usages, and the Christian priest often supervised the ordeal and blessed the water, fire, iron, and the spectators who were required to be present and arranged everything deemed necessary to make the proceedings legal.

The following regulations governing the ordeal of hot water and that of hot iron date from the reign of King Athelstan of England (*d.* 940). They illustrate how Christian and pagan ideas mingled.

> And concerning the ordeal we enjoin by command of God and of the archbishop and of all bishops: that no man come within the church after the fire is borne in with which the ordeal shall be heated, except the mass-priest, and him who shall go thereto: and let there be measured nine feet from the stake to the mark, by the man's feet who goes thereto. But if it be water, let it be heated till it come to boiling. And be the kettle of iron or of brass, of lead, or of clay. And if it be a single accusation, let the hand dive after the stone up to the wrist; and if be threefold, up to the elbow. And when the ordeal is ready, then let two men go in of either side; and be they agreed that it is so hot as we before have said. And let go in an equal number of men of either side, and stand on both

MAP XIX.—Expansion of Christianity from A.D. 400 to 1300.

sides of the ordeal, along the church; and let these all be fasting . . . and let the mass-priest sprinkle holy water over them all, and let each of them taste of the holy water, and give them all the book and the image of Christ's rood to kiss: and let no man mend the fire any longer when the hallowing is begun; but let the iron lie upon the hot embers till the last collect: after that, let it be laid upon the stake; and let there be no other speaking within, except that they earnestly pray to almighty God that he make manifest what is soothest. And let him go thereto; and let his hand be wrapped, and be it postponed till after the third day, whether it be foul or clean within the wrapping. And he who shall break this law, be the ordeal with respect to him void, and let him pay to the king cxx shillings as fine.

Saints figured prominently in popular religion. Holy men and women had sealed their faith by dying for it, sometimes suffering excruciating torments. Such martyrs were duly remembered and their sufferings commemorated. Their relics were preserved and used for religious edification. The pious thought that the holy martyrs were close to God and that their intercession therefore might be helpful. There were many saints, most of them historical persons, and pious stories about them were numerous. Ignorant and in many cases superstitious, the people embroidered their saints' lives with miraculous incidents. Relics wrought astounding cures. Thus miraculous cures were effected by means of the shoes of St. Cuthbert, who had been bishop of Lindisfarne.

Conversion of the Barbarians: The Germans. The work of converting the barbarians was accomplished during the Dark Ages. The Germanic tribes were deeply attached to their ancient pagan practices. Some, indeed, had embraced Christianity during the fourth century while living along the borders of the Roman Empire. Among these were the Visigoths, Ostrogoths, Vandals, Burgundians, and Lombards. They were heretical Arians, and their ideas and practices were crude compared with those of Orthodox Christians like St. Augustine of Hippo and St. Jerome. The Franks, Angles, Saxons, and other Germans who stayed in Germany were later converted to the Catholic faith. It was hard to wean them from pagan ways, which included fortune-telling, the use of amulets, a dependence on omens such as the flight of birds and the whinnying of horses, human sacrifices, judicial ordeals, and other rites.

To become Christians, pagan Germans upon baptism renounced the "works of the devil" and professed their faith in the true God. Formulas were prepared for this purpose, the following being used frequently among the Franks:

Question: Dost thou forsake the devil?
Answer: I do forsake the devil.
Question: And all devil worship?

ANSWER: I do forsake all devil worship.
QUESTION: And all the devil's work?
ANSWER: And I do forsake all the devil's works and words, Thor and Odin and Saxnot and all the evil spirits that are their companions.

Having renounced the pagan gods and works of the devil by these responses, the convert next affirmed his faith in Christianity.

QUESTION: Dost thou believe in God the almighty Father?
ANSWER: I believe in God the almighty Father.
QUESTION: Dost thou believe in Christ the Son of God?
ANSWER: I believe in Christ the Son of God.
QUESTION: Dost thou believe in the Holy Spirit?
ANSWER: I believe in the Holy Spirit.

CONVERSION OF THE FRANKS. Often wholesale conversion followed the example of a tribal king. An interesting case is that of Clovis, King of the Franks. Hard pressed during a battle with the Alamanni in 496, he feared defeat. His wife St. Clotilda had often urged him to become a Christian; now he thought to buy victory by proposing conversion and made the following appeal:

Jesus Christ, whom Clotilda asserts to be the Son of the living God, who art said to give aid to those in distress, and to bestow victory on those who hope in thee, I beseech the glory of thy aid, and vow that if thou wilt grant me victory over these enemies, and I shall know the power which she says that people dedicated in thy name have had from thee, I will believe in thee and be baptized in thy name. For I have invoked my own gods, but, as I find, they have withdrawn from aiding me; and therefore I believe that they possess no power, since they do not help those who obey them. I now call upon thee, I desire to believe thee, only let me be rescued from my adversaries.

The Alamanni were defeated and Clotilda besought St. Remi, Bishop of Reims, to baptize Clovis.

And the bishop sent for him secretly and began to urge him to believe in the true God, maker of heaven and earth, and to cease worshiping idols which could help neither themselves nor any one else. But the king said, "I gladly hear you, most holy father; but there remains one thing: the people who follow me cannot endure to abandon their gods; but I shall go and speak to them according to your words." He met with his followers, but before he could speak the power of God anticipated him, and all the people cried out together: "O pious king, we reject our mortal gods, and we are ready to follow the immortal God whom Remigius preaches."

After the baptistry had been prepared, the following ceremony took place:

. . . The king was the first to ask to be baptized by the bishop and advanced to the baptismal font, to terminate the disease of ancient leprosy and wash away with

fresh water the foul spots that had long been borne. And when he entered to be baptized, the saint of God began with ready speech: "Gently bend your neck, O Frank; worship what you have burned, burn what you have worshipped." . . . And so the king confessed all-powerful God in the Trinity, and was baptized in the name of the Father, Son, and Holy Spirit, and was anointed with the holy ointment with the sign of the cross of Christ. And of his army more than three thousand were baptized.[1]

Conversion of the Angles, Saxons, and Jutes. The German tribes (Angles, Saxons, and Jutes) who settled in Britain during the fifth century long remained pagan. Christianity, introduced in Roman days, had almost vanished from the island, and the Catholic faith was not brought in among these tribes until the mission of St. Augustine of Canterbury in 597. He was sent by Gregory the Great, Pope from 590 to 604, to Kent, over which King Ethelbert ruled. The Venerable Bede (*d.* 735) relates his arrival in a classic passage.

In this island landed the servant of our Lord, Augustine, and his companions, being, as is reported, nearly forty men. . . . And sending to Ethelbert, signified that they were come from Rome, and brought a joyful message, which most undoubtedly assured to all that took advantage of it everlasting joys in heaven, and a kingdom that would never end, with the living and true God. . . . Some days after, the king came . . . and sitting in the open air, ordered Augustine and his companions to be brought into his presence. For he had taken precaution that they should not come to him in any house, lest, according to an ancient superstition, if they practiced any magical arts, they might . . . get the better of him. But they came furnished with divine, not with magic, power, bearing a silver cross for their banner, and the image of our Lord and Saviour painted on a board; and, singing the litany, they offered up their prayers to the Lord for the eternal salvation both of themselves and of those to whom they were come. . . . Accordingly he permitted them to reside in Canterbury, which was the metropolis of Ethelbert's dominions. . . . It is reported that, as they drew near to the city, after their manner, with the holy cross, and the image of our sovereign Lord and King, Jesus Christ, they in concert sang this litany: "We beseech thee, O Lord, in all thy mercy, that thy anger and wrath be turned away from this city, and from the holy house, because we have sinned. Hallelujah." . . . When Ethelbert, among the rest, induced by the unspotted life of these holy men, and their delightful promises . . . believed and was baptized, greater numbers began daily to flock together to hear the word, and forsaking their heathen rites, to associate themselves, and believing, to the unity of the church of Christ.

Conversion of Northumbria. The barbarians were impressed by the certitude of Christian teaching. They were troubled by the question of man's destiny, and the doctrine of the resurrection of the body and the prospect of a serene conscience attracted them. What

[1] Gregory, Bishop of Tours, *History of the Franks*, Selections, Translated with notes by E. Brehaut, pp. 40–41, Columbia University Press. New York: 1916.

St. Paul wrote in I Corinthians 15 reassured their fears—"O death, where is thy sting? O grave, where is thy victory?" This is illustrated by a tale from Bede's account of the conversion of King Edwin of Northumbria about 627. The royal councilors discussed the proposed step with the king. Coifi, his chief priest, was eager for the change because, he declared, he had not prospered even though he had worshiped the old gods. Another councilor spoke these words:

> The present life of man, O king, seems to me, in comparison of that time which is unknown to us, like to the swift flight of a sparrow through the room wherein you sit at supper in winter with your commanders and ministers, and a good fire in the midst, whilst the storm of rain and snow prevail abroad; the sparrow, I say, flying in at one door, and immediately out another, whilst he is within, is safe from the wintry storm; but after a short space of fair weather, he immediately vanishes out of your sight, into the dark winter from which he had emerged. So this life of man appears for a short space, but of what went before, or what is to follow, we are utterly ignorant. If, therefore, this new doctrine contains something more certain, it seems justly to deserve to be followed.

Then spoke Coifi:

> I have long since been sensible that there was nothing in that which we worshiped; because the more diligently I sought after truth in that worship, the less I found it. But now I freely confess, that such truth evidently appears in this preaching as can confer on us the gifts of life, of salvation, and of eternal happiness. For which reason I advise, O king, that we instantly abjure and set fire to those temples and altars which we have consecrated without reaping any benefit from them.

The king accepted the new faith. Coifi was eager to desecrate the altars and temples of the gods.

> Then immediately, in contempt of his former superstitions, he desired the king to furnish him with arms and a stallion, and mounting the same, he set out to destroy the idols, for it was unlawful for the high priest either to carry arms or to ride on any but a mare. Having, therefore, girt a sword about him, with a spear in his hand, he mounted the king's stallion and proceeded to the idols. The multitude, beholding it, concluded he was distracted; but he lost no time, for as soon as he drew near the temple he profaned the same, casting into it the spear which he held; and rejoicing in the knowledge of the worship of the true God he commanded his companions to destroy the temple, with its enclosure, by fire.[1]

Conversion of the Celts. Meanwhile, the Celts living in Britain, Scotland, and Ireland had been brought into the Christian fold. As pagans they had been instructed by the druids, a priestly caste that taught religion, poetry, and practical arts as well. The druids con-

[1] Quotations from Bede's *The Ecclesiastical History of the English Nation*, pp. 35–36, 90–92, Everyman's Library, J. M. Dent and Sons, Ltd., London.

sulted oracles, practiced witchcraft, performed sacrifices, and frequently brought human victims to their bloody altars. The first systematic effort to convert the Celts began with St. Patrick (*d.* 461). He was born in Britain but was seized and sold as a slave in Ireland in his sixteenth year. He escaped from his masters and spent many years in the monasteries of southern Gaul. In 432, he returned to Ireland and began a vigorous missionary career. During the next thirty years he traveled over the island bringing everywhere the story of the gospel. It was perilous work, for the druids and their supporters often tried to kill him. But, undaunted, he persevered, baptizing converts and organizing churches, and was so successful that he has ever since been regarded as Ireland's patron saint.

The churches that St. Patrick founded differed markedly in organization from those on the Continent. As Ireland had neither towns nor manorial estates, the organization of dioceses and parishes was impossible and tribal groups became the basis of ecclesiastical divisions. Another feature was the extremely ascetic character of Irish Christians; each church really was a monastery. The priests were monks in that they lived according to a rule and had taken vows. Discipline was severe: the monks were kept busy, were punished for petty infractions, ate and drank sparingly, slept little, avoided women, and spent much time in devotions. The central figures in the Irish churches were not bishops as on the Continent but abbots.

Celtic Christianity, austere and harsh, was the finest training school for missionaries. St. Columba (*d.* 597) founded a monastery on Iona, an island off the Scottish coast. From it went forth missionaries who Christianized Scotland and northern England. Others like St. Columbanus (*d.* 615) went to the Continent and labored in the Rhine Valley. He and his followers founded the famous monasteries of Luxeuil, St. Gall, Reichenau, and Bobbio, spreading Christian teaching among the pagan Germans and preparing them for their subsequent admission into the church.

Conversion of the Slavs. The Slavs did not become Christian until after the middle of the ninth century. The first missionaries among them were St. Cyril (*d.* 869) and St. Methodius (*d.* 885), two Greek brothers from Thessalonica invited by the ruler of Moravia to teach the people. They successfully preached in Slavonic, adapted the Greek alphabet to the Slavonic tongue, and translated the Gospels and liturgical books. The Christian faith gradually spread into Bohemia and neighboring parts of Poland. The South Slavic Serbians received the new faith before 875. Their half-Slavic half-Finno-Ugrian neighbors, the Bulgars, soon followed their example. By this time there also were Christians in the trading centers of southern Russia and the Dnieper Valley. The

Russian queen Olga was baptized at Constantinople in 957. But Christianity did not become the official religion of Russia until the rule of her son Vladimir (*d.* 1015). The new religion and liturgy spread rapidly through all East Slavic lands. Organization was perfected, monasteries established, and by the year 1000 practically all Russians had become Christian.

Europe now was Christian save for a few peoples occupying the backward lands along the Baltic Sea. The Finns and Lithuanians remained heathen for several centuries. The conversion of all peoples from the rocky islands off the Scottish coast to the broad plains of Russia forms a noteworthy chapter in history. The church that now embraced practically all Europeans molded the lives of men, gave them a doctrine on life and its problems, and helped to develop arts and sciences. The work of intrepid missionaries, humble monks, and ecclesiastical statesmen deserves an important place in the history of civilization.

St. Benedict and His Rule. A powerful agency in the work of transforming the rough barbarians into Christians and more civilized beings was Benedictine monasticism. St. Benedict (480–557?), born near Spoleto, forsook his parental home when seventeen years of age and lived like a hermit in the wilds of Subiaco. Word of his sanctity went abroad, and soon others desired to live with him but were not willing to render obedience to him. Finally, in 528, he retired to Monte Cassino in the Apennines midway between Rome and Naples, where he founded a monastery.

St. Benedict's rule was distinctive. A moderate man, he would have none of the austerities of hermits like St. Anthony of Egypt or pillar saints like St. Simeon Stylites. His purpose was simply to organize a house where monks might live under a common rule, sharing their labors and devotions. His monastery was to be a "school of divine service." Benedictine monks, who called each other "brothers," elected an abbot for life. Their rule stated the hours for rising and sleeping, which varied according to season. It also fixed the monk's routine of labor, reading, prayer, services, and meals. The monks practiced poverty, celibacy, and obedience. Discipline was mild, special consideration being shown to the sick and the weak. Sweet reasonableness pervaded Benedictine monasteries and made them popular.

Attracted by this moderation, many men and women entered the order, and new monasteries sprang up everywhere. These houses deeply influenced the religious life and morals of laymen. St. Benedict's idea was that his rule should help people who wished to lead a simple religious life under a systematic plan. Had he foreseen the great economic and worldly success houses adopting it were to achieve, he probably would have hesitated before putting it into practice.

It is the fashion to praise the social, economic, and intellectual contributions of the Order of St. Benedict but to ignore its religious aspects. It is true that the monks cleared forests, drained swamps, raised fruit trees, produced better cattle, and improved the soil by careful methods of agriculture. In consequence, many of the monastic estates became very rich. Monasteries also housed monks who were eager for learning. The Latin classics like Vergil and Cicero were read and copied, and the elements of science studied. In material and intellectual as well as religious matters the order was to play a role that St. Benedict could not have foreseen. But it must be kept in mind that the promotion of religious life was the original motive for founding monasteries; the material and other consequences were incidental and entirely unpremeditated.

Influence of Individual Churchmen. Able churchmen like St. Martin of Tours and St. Honoré of Lérins helped to make the youthful church the great institution it became. Probably the most influential was Gregory the Great, Pope from 590 to 604 and head of those vast estates which had been given to the church of St. Peter—the Patrimony of St. Peter—the income from which was used for the support of the church and for charity. While Gregory was busy managing these estates, supervising the serfs, and looking after their religious interests, he also found time to bring heretics and pagans into the fold. He induced the Arian Lombard king to let his son be brought up a Catholic Christian, which later resulted in the conversion of the Lombards. Gregory also began the conversion of the Angles, Saxons, and Jutes when in 596 he sent St. Augustine to Canterbury. He greatly extended the sway of the Roman see and as an ecclesiastical statesman has seldom been equaled. His contributions to the literature of the period are discussed on pages 312 to 313.

Literature in the Dark Ages; Attitude toward Pagan Letters. Originally, Christians would have nothing to do with pagan Greek and Roman books because of their polytheistic nature and their frequently immoral stories about the gods. The Church Fathers objected to this literature in spite of the fact that they themselves had learned to write good Greek and Latin by reading such books. St. Augustine complained of the possible bad influence of these pagan writers. Terence, for example, in one of his plays brought a lewd youth upon the stage who justified immorality because a god had set the example!

> And what God? Great Jove,
> Who shakes heav'n's highest temples with his thunder,
> And I, poor mortal man, not do the same!
> I did it, and with all my heart I did it.

St. Augustine's comment is typical of what many Christians felt.

Not one whit more easily are the words learnt for all this vileness; but by their means the vileness is committed with less shame. Not that I blame the words, being, as it were, choice and precious verses; but that wine of error which is drunk to us in them by intoxicated teachers; and if we, too, drink not, we are beaten, and have no sober judge to whom we may appeal. Yet, O my God (in whose presence I now without hurt remember this), all this unhappily I learnt willingly with great delight, and for this was pronounced a hopeful boy.

St. Jerome likewise had serious misgivings about the propriety of reading pagan authors. He had denied himself everything—home, parents, relatives, choice food, and comfortable clothing—but when he went to Jerusalem to live the life of an ascetic recluse, he could not deny himself the pleasure of reading pagan classics.

I could not bring myself to forego the library which with great care and labor I had got together at Rome. And so miserable man that I was, I would fast, only to read Cicero afterwards. I would spend long nights in vigil, I would shed bitter tears called from my inmost heart by the remembrance of my past sins; and then I would take up Plautus again.

Once St. Jerome fell sick and thought he was about to die, and preparations were made for his burial. But he had a vision.

Suddenly I was caught up in the spirit and dragged before the Judge's judgment seat: and here the light was so dazzling, and the brightness shining from those who stood around so radiant, that I flung myself upon the ground and did not dare to look up. I was asked to state my condition and replied that I was a Christian. But He who presided said: "Thou liest; thou art a Ciceronian, not a Christian. For where thy treasure is there will thy heart be also."

Object as they might to the immoralities of pagan literature, Christians could not do without the rhetoric, philosophy, and science of the Greeks and Romans. Churchmen took over the old rhetoric, and classical learning became in part the foundation on which medieval learning was built. It is true that ascetic people in the Middle Ages had qualms of conscience when they read Vergil or Ovid. Such men, however, were more or less exceptional, and thus ancient learning continued to influence medieval thinking.

Each age produces its distinctive form of literature, and the Dark Ages were no exception to this rule. It was a period of faith, there were many saints, and the populace had a sincere, if naïve, belief in miracles and relics. The typical popular literature of the Dark Ages is "hagiography," or stories of the saints. There are many of these tales—some long and some short, some good history and some pure fiction—that have been brought together in a vast collection known as the *Acta*

sanctorum, or *Acts of the Saints*. These accounts were widely read, especially in monasteries, where many of them originated. They constituted the combined theology, poetry, fiction, history, and philosophy of the period.

Gregory the Great, Pope from 590 to 604, did more than any other ecclesiastic to foster the writing of saints' lives. His *Dialogues*, written to amuse Christians and prove by the abundance of miracles the truth of the Christian faith, became immensely popular, being read everywhere and by every generation until the last few centuries. The work is in four parts, the second of which contains the first account of the life of St. Benedict, who died during Gregory's youth.

Gregory was a great preacher as well as a great writer. Forty of his sermons, the *Homilies*, have survived. Sermons proved to be one of the best ways to instruct the people in the truths of religion. Gregory's discourses were simple and direct, filled with homely illustrations drawn from everyday life so that all could understand the moral. The *Homilies* set a popular example for the preachers of later centuries. As with the *Dialogues*, untold numbers read them with delight.

Gregory's *Magna moralia*, a commentary on the Book of Job, became the fundamental book on theology during the Middle Ages. No work on this subject, not even the *Summa* of Thomas Aquinas (*d.* 1274), was more highly regarded and more painstakingly studied. But the book is difficult reading, for ways of thinking and of looking at the most commonplace facts have so changed that much of the book no longer appeals to us. Gregory thought of the world as a metaphor: behind what the world *seems to be* stands another and greater world, which *actually exists*. This is the world of the spirit; the visible world is an emblem of something else. To Gregory the Book of Job was a wonderful allegory, a figurative story of something not expressed but implied metaphorically. Through his *Magna moralia*, Gregory helped to popularize the method of interpreting Scripture allegorically. The *Magna moralia* is really not a commentary on Job but a collection of sermons many of which seem wholly off the point. Every line in Job is "merely a peg on which to hang disquisitions on all manner of subjects —theological, philosophical, and moral."

Gregory's *Pastoral Care* deals with the duties of bishops, the chief pastors of the Christian flocks. In it Gregory lays down rules governing the selection of bishops. The episcopal office is of central importance in the church, for it directs religious life; it is the "citadel of teaching," and much depends upon the character of bishops chosen. A bishop should have special gifts to be an administrator of souls who are spiritually sick. He must be morally upright, devoted to spiritual ways, unencumbered by material concerns, sympathetic toward the weak yet not

deceived by sham and false humility, forgiving yet not too ready to forgive, cautious in speech and action, moderate in preaching, and an example in all relations with his subjects. The *Pastoral Care* has nothing to say about the practical aspects of a bishop's work, which included the supervision of the estates from which the episcopal establishment derived its income, but is solely a statement on the ideal character of bishops. Had it been followed at all times, the history of the church would have been different. The book, read in all parts of the Christian world, was translated into Anglo-Saxon by order of King Alfred the Great (*d.* 900).

Boethius. Boethius (*d.* 526), a Roman scholar, was born in Rome, belonged to the aristocracy of the city, and served under King Theodoric (*d.* 526), who had set up an Ostrogothic kingdom in Italy. Boethius undeservedly incurred Theodoric's suspicion and was executed; later ages have regarded him as a martyr. Educated in the best Roman traditions, he took great interest in ancient learning, Greek as well as Roman. This was unusual at this time, for the empire was in full decline. The number of educated people was decreasing, and intellectual life was growing narrower. Greek literature disappeared from the West almost entirely during the fifth and sixth centuries, and such great churchmen as St. Augustine did not use the language.

Although Boethius wrote a number of books on arithmetic and music, he was more interested in the works of Plato and Aristotle and intended to translate most of them. He wanted to preserve, by means of translations from Greek into Latin, the science and learning of the past. His translations of Aristotle's *Categories* and *De interpretatione* were of the utmost importance to the intellectual development of the West. During the Dark Ages, especially after 600, there were few men who read Greek. Those who read books in that language could seldom find any of the works of the ancient philosophers and scientists. Libraries had once been common, especially in Rome, but when the cities declined the libraries were neglected and disappeared. Greek books virtually vanished, and only a remnant of Latin writings survived. Boethius's translations were for many centuries the only source of knowledge about Aristotle's philosophy.

Some of Boethius's own works deal with theological matters and show that the writer was a Christian. However, the *Consolation of Philosophy*, written while he was in prison awaiting execution and, as pure literature, his greatest work, though a philosophical statement of the problem of life and death contains not a word about the solace of Christian teaching. Scholars have for this reason asked whether Boethius really was a Christian; but no one today doubts that he was, for Cassiodorus, who lived a generation later, refers to him as the author of the orthodox treatise *The Trinity*. The *Consolation of Philosophy*

continued as a popular book throughout the Middle Ages because of its high moral tone and teaching.

Education: The Liberal Arts. Education suffered during the economic, political, and social decline of the Roman Empire. As literature declined steadily in quantity and quality, students read less and less. Studies were grouped under seven headings called the "liberal arts." The word "liberal" derived from *liber*, meaning "free," distinguished the book arts from the crafts of laborers. Grammar, rhetoric, and logic came to be known as the trivium. Geometry, arithmetic, astronomy, and music constituted the quadrivium. Students rarely mastered all seven of the liberal arts but devoted themselves primarily to the trivium, especially grammar. The subject matter of the liberal arts was not nearly so narrow as with us today. People of the Middle Ages read the great authors while studying grammar and logic and also made incursions into philosophy and theology. It is well to bear this fact in mind, for it is possible to misunderstand what was formerly comprised in the liberal arts.

Cassiodorus. Cassiodorus, who died about 583, was a native of southern Italy, who, like Boethius, exerted great influence on education. He tried to organize a school of theological study in Rome, but the long and destructive wars between Justinian and the Ostrogoths made this idea impracticable. Retiring to his ancestral estates in southern Italy, he founded a monastery at Vivarium in which he tried to put his ideas into practice. The central idea was that monks should become learned men well versed in Scripture and trained to explain the sacred texts. They were to read the Latin Church Fathers and historians like Josephus and Eusebius. Finally, they were to be instructed in the liberal arts, especially the trivium.

We have learned that monks were men who retired from the world to live according to a common rule behind the walls of a cloister. Their original purpose was religious contemplation and not intellectual development. St. Benedict's humane rule gave some attention to such work as reading Scripture and the lives of the saints; but this was primarily for pious edification. It is to the glory of Cassiodorus that he placed as much emphasis upon intellectual work as upon other monastic duties. Benedictine houses later followed the example of Vivarium. That they became havens of learning in which the remains of ancient scholarship were preserved is due largely to the example of Cassiodorus.

Science in the Dark Ages. The range of scientific knowledge was very small during the Dark Ages. This was inevitable after Greek scientific inquiry had declined and Roman effort had completely died out. A number of scientific books like Pliny's *Natural History* were at hand; but there was a lamentable failure to add to knowledge, and the growing

habit of studying natural phenomena allegorically did not encourage scientific study. Further, men accepted the statements of Aristotle and Pliny about nature without checking them with observable facts. We must not blame scholars of the Dark Ages too much, however, because the Greeks and Romans themselves, long before the decline of the empire, had prepared the way for this attitude. The new ages delighted in small, handy collections called "encyclopedias," which, they fancied, answered all questions authoritatively.

Isidore of Seville. Isidore of Seville (*d.* 636) prepared an encyclopedia known as the *Etymologies*. He was a great churchman, encouraging by his authority as bishop the study of the liberal arts, law, and medicine. He ordered all bishops to establish schools, a policy that would probably have led to important results had the Arabs not conquered Spain in 711.

Isidore is one of the great figures of the Dark Ages. His *Etymologies* were popular throughout the Middle Ages and proved as useful as the *Encyclopaedia Britannica* is today. He quotes from about one hundred and fifty ancient writers, Christian as well as pagan. After discussing the seven liberal arts, he reviews medicine, law, the calendar, theology, and other topics. However, his knowledge about the world was neither broad nor accurate. He believed things could be explained simply by the etymology of their names, and his etymologies frequently are entirely wrong. The following is his comment on man:

> Man (*homo*) is so called because he was made of earth (*ex humo*), as is told in Genesis. . . . The liver (*iecur*) has its name because there is resident the fire (*ignis*) which flies up into the brain. Thence it is spread to the eyes and the other senses and members and by its heat it changes into blood the liquid that it has drawn from food, and this blood it supplies to the several members to feed and nourish them. . . . The spleen (*splen*) is so called from corresponding to (*a supplemento*) the liver on the opposite side, so there may be no vacuum. And certain men say that it was made on account of laughter. For by the spleen we laugh, by the bile we become angry, by the heart we gain wisdom, and by the liver we love.[1]

Medicine in the Dark Ages. Obviously, medical practice could make no progress during the Dark Ages against a background of uncritical thought. As the Roman Empire disintegrated, the elaborate medical lore of Hippocrates and Galen was neglected. The new age was interested in allegory, professing to see hidden meanings behind the visible aspects of nature. The study of specific objects without philosophic bias, so necessary in science, became impossible. Scholars preferred to accept science on the authority of men like Pliny rather

[1] Quoted in C. Stephenson, *Mediaeval History: Europe from the Fourth to the Sixteenth Century*, p. 219, Harper & Brothers, New York.

than to investigate nature at first hand. Under these circumstances, magic, popular leechcrafts, incantations, charms, and spells were commonly employed. The Celt, German, and Slav who had never heard of the medical craft of Galen could only rely upon curious folk practices that probably went back to the Bronze Age.

The Germans tried to cure ills by means of charms. The following, taken from the Merseburg incantations, was supposed to be effective in curing sprains:

> Balder and Woden fared to a wood;
> there was Balder's foal's foot sprained . . . .
> Then charmed Woden as well he know how
> for bone sprain, for blood sprain, for limb sprain.
> Bone to bone, blood to blood,
> limb to limbs as though they were glued.

Later, after the Germans had been converted to Christianity, this charm was recited in Christ's name. Such charms were repeated for all manner of ills. Infections were supposed to be caused by poisons carried by the breezes, and the following charm was used against them:—

> For flying venom, smite four strokes
> Towards the four quarters with an oaken brand,
> Make the brand bloody, throw away, sing this thrice:
> Matthew leads me.
> Mark preserves me.
> Luke frees me.
> John aids me.

Elves, creatures that the lively imagination of our Germanic ancestors pictured as dwelling in wood and swamp, brought disease to men and cattle. Sick men and animals were said to be "elf-shot." The following incantation was employed to cure them:

> If a horse be shot. Take then a knife of which the handle is horn of a roan ox and on which are three brass nails. . . . Inscribe then Christ's cross on the back. . . . Take then the left ear and prick it through silently. . . . Take then a staff, smite the horse on the back, then is the horse whole. . . . Whatever the elf, this has power as a remedy.

Only occasionally was a more enlightened method employed. Throughout the West, medical knowledge was inferior to that of the Persians and Jews during the Ommiad and Abbasside caliphates, who derived their knowledge directly from the works of Galen. Christian Europe was not to regain this treasure house of information until the twelfth century. It is obvious that the higher culture of western Europe at this time was meager as compared with that of Byzantium and

especially the Arabic world. But the germs of a great future are discernible amid the rudeness of the Christian lands of the West.

FOR FURTHER READING

BURY, J. B.: *The Life of St. Patrick and His Place in History*
CARTER, J. B.: *The Religious Life of Ancient Rome*
CHAPMAN, DOM JOHN: *Saint Benedict and the Sixth Century*
DAWSON, CHRISTOPHER: *The Making of Europe*
DILL, SIR SAMUEL: *Roman Society in Gaul in the Merovingian Age*
DOPSCH, ALFONS: *The Economic and Social Foundations of European Civilization*
DUDDEN, F. H.: *Gregory the Great*
GOUGAUD, DOM LOUIS: *Christianity in Celtic Lands*
HOLMES, T. S.: *The Origin and Development of the Christian Church in Gaul*
KURTH, GODEFROID: *St. Boniface*
LAISTNER, M. L. W.: *Thought and Letters in Western Europe, A.D. 500–900*
MACNEILL, EION: *Celtic Ireland*
———: *St. Patrick, Apostle of Ireland*
MOSS, H. ST.L.: *The Birth of the Middle Ages*, 395–814
PIRENNE, HENRI: *Mediaeval Cities and Commerce*
POTOCEK, C. J.: *Cyril and Methodius: Apostles of the Slavs*
RAND, E. K.: *Founders of the Middle Ages*
RYAN, JOHN: *Irish Monasticism, Origins and Early Development*
SINGER, C. J.: *From Magic to Science*
WORKMAN, H. B.: *Evolution of the Monastic Ideal*

Chapter XX

THE CAROLINGIAN RENAISSANCE

The historical importance of the Carolingian Age far transcends its material achievement.—Christopher Dawson

CHARLEMAGNE (*d.* 814), the first imposing personality in western Europe after St. Augustine, so dominated the eighth and ninth centuries that scholars have designated them as the Carolingian Age. This period marks the rise of a specifically Christian European culture culminating in the civilization of the Middle Ages.

Life in Frankland, as Gaul was called after its conquest by the Franks under Clovis (*d.* 511), was essentially manorial, being derived from the institutions of the Romanized Celtic population of the Roman Empire. Seigniors who owned the landed estates, or manors, as well as the peasants who worked the land, were rude, illiterate, and superstitious. Industry was manorial, and there was thus little trade or travel. The peasant's intellectual horizon was limited by the boundaries of the estate. His manners and daily routine were determined by the customs of his forefathers. Yet the invading Franks had much to learn from the serfs on the estates of the Romanized seigniors, for their agricultural life was not nearly so well developed. Unable to add to the declining Gallic culture, the net effect of the Frankish conquest was a continuing deterioration.

The Merovingian Family. From the standpoint of civilization, Clovis and his successors (the Merovingian family) did little to promote progress. Possessing little elevation of mind, they were incapable of directing the Franks to higher things. Members of the royal family lived in blood feud with each other. The realm, when passed from father to sons, was divided into several parts. Usually the sons fought bitterly to get possession of the whole heritage. They extended their feuds against the children of their brothers, even slaying babes in their cradles. Eventually the kings of this house became so weak and incompetent that they could not manage the affairs of the kingdom. Political authority slipped from their hands and passed into the control of energetic and resourceful noblemen, a few of whom became "mayors of the palace," a term practically equivalent to our "secretary of state." Of these the Carolingian family was the most prominent. The Merovingians, who were called the "Do Nothing Kings," failed to unite

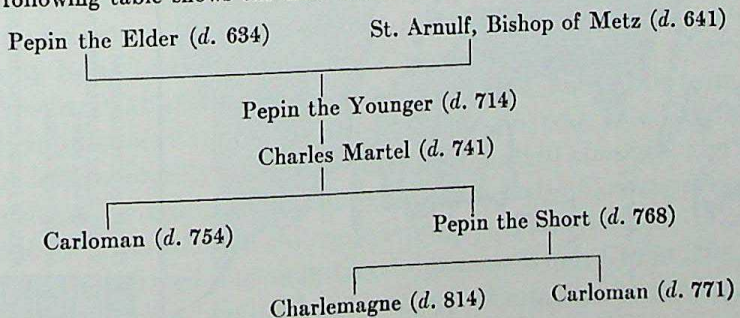
with the constructive forces of the time—the church, monasticism, and Christian learning.

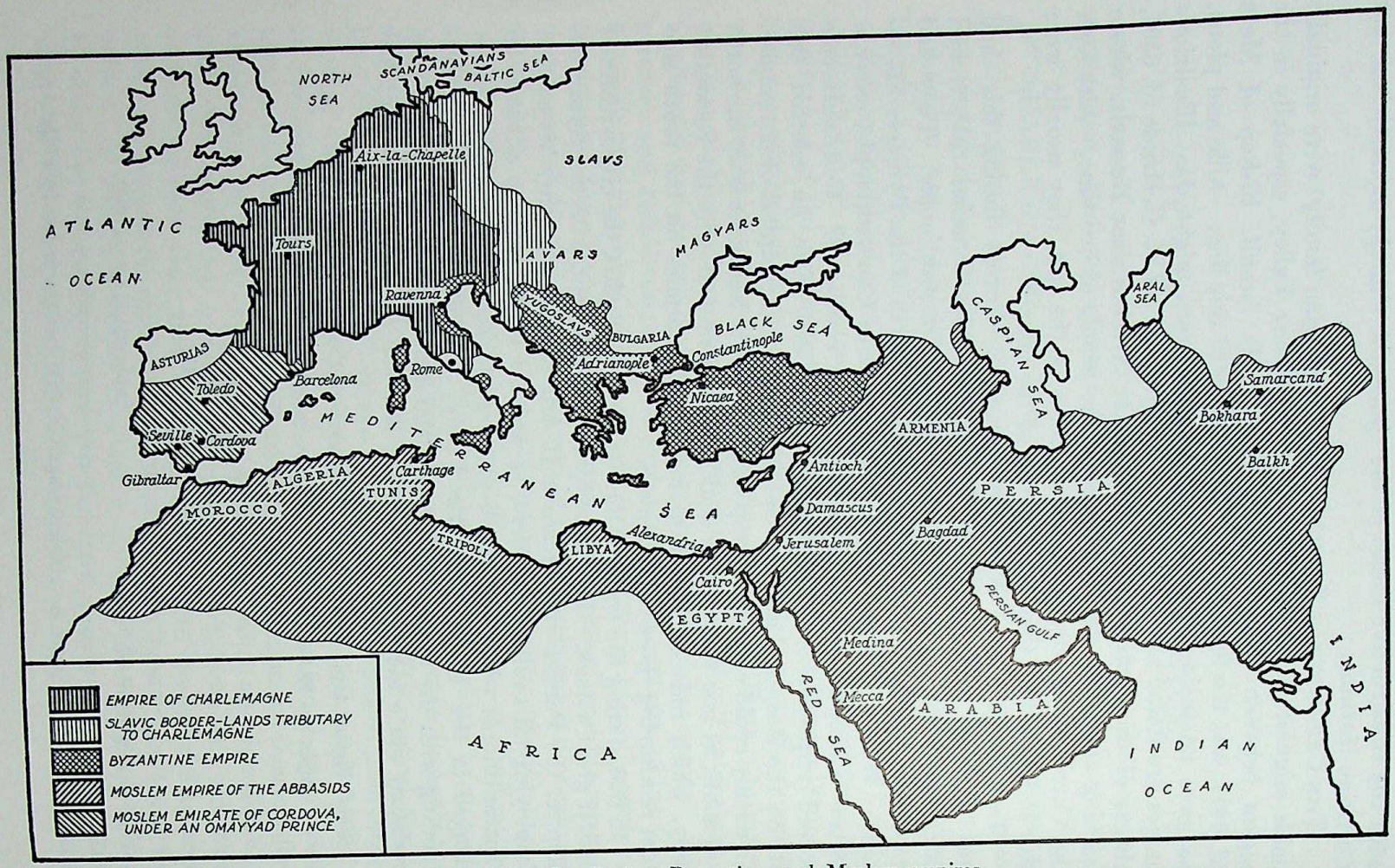
THE CAROLINGIAN FAMILY. The Carolingian family[1] were originally noble seigniors possessing estates in the Meuse Valley, especially in the region between Brussels and Cologne. St. Arnulf, Bishop of Metz (*d.* 641), was the first noteworthy member of this line. Able and pious, he gave an intimation of what his successors might do. Illustrious names are found among them, for example, that of St. Gertrude (*d.* 659), abbess of the Benedictine monastery at Nivelles near Brussels, whose learning and piety deeply impressed the people of her time. Although the Carolingians shared in the rudeness of the age, they usually were able to appreciate the civilizing role of the church.

THREAT OF ARAB CONQUEST AVERTED. Europe during this time was seriously threatened by the Arabs. The Ommiad caliphs had extended their conquests to the gates of Constantinople. They had conquered Spain in 711 and soon appeared north of the Pyrenees Mountains. Would it be possible for them to seize Constantinople, overrun central Europe, and reduce the whole continent? Constantinople proved impregnable. Constantine chose well when he selected this site on the Bosporus and the Golden Horn for the capital of his empire. No enemy could collect an army large enough to besiege it from the north and south at one time. Nor could a hostile fleet destroy the Byzantine navy, which rode on the Bosporus, keeping armies on the south side from reinforcing those on the north.

In 626, during the reign of the Emperor Heraclius, the city withstood its first great attack. Provoked by the historic feud with the Byzantine Empire, the Persian ruler Khosru II determined to destroy his enemy. Employing all available soldiers, he ordered his generals to advance on Constantinople while he himself proposed to keep the Byzantine forces engaged in the Tigris-Euphrates Valley. He also came to an understanding with the khan of the Avars, the nomads who had established a predatory state along the Danube. But the Byzantine fleet kept the

[1] The following table shows the chief members of the Carolingian house:





MAP XX.—Carolingian, Byzantine, and Moslem empires.

Avars and the Persians apart. An assault by the Avars failed signally, and the Persians finally were forced to retire.

Fired by the energy of a newborn state, the Arabs were confident of victory. The Caliph Mo'awiya laid siege to Constantinople in 669, but the attempt failed completely. Another series of attacks took place between 674 and 680. A great naval battle was fought in 674 in which the Byzantines, aided by the novel weapon of Greek fire, seriously damaged the Arab squadrons. But the greatest naval victory before Constantinople occurred during the siege of the Arabs (717–720) in the reign of the Emperor Leo III, called the Isaurian, who ruled from 717 to 741. The Arabs launched an army of 80,000 men and 1,800 sail. Part of their forces crossed over the Bosporus to attack the city from the north. But the superiority of Byzantine naval tactics, the use of the deadly Greek fire, and the disaffection of the Christian sailors serving with the Arabs shattered their fleet. An attack by the nomadic Bulgars, instigated by Leo, completed the rout.

If the Arabs had won, they probably would have swept over the Balkan Peninsula. The entire Danubian valley would have been open to them, and they could readily have joined forces with their distant kin in the fields of Frankland. Europe probably would have become Mohammedan. Slavic lands that still were heathen would have embraced the Koran and the fate of Christianity would perhaps have been sealed. The course of history would have been changed, and our modern civilization, founded directly upon the culture of medieval Christian Europe, would have had a distinctly Near Eastern flavor.

The Arabs were also destined to meet defeat in Frankland. Their raids seemed irresistible until Charles Martel (*d.* 741), a member of the Carolingian family and mayor of the palace, collected a formidable army to oppose them. The Arabs had advanced upon Tours, a city noted as the place where St. Martin had died and where his tomb was to be found. They proposed to despoil it of its votive offerings but were opposed by Charles's foot soldiers for several days. The main battle (732) was stubbornly contested, but the superb Arab cavalry could not prevail against the disciplined soldiers of Charles Martel and retired under cover of night. Other raids followed, but any hope the Arabs may have had of conquering Frankland was forever lost. Thus, in the West as in the East, Europe was saved from an Asiatic inundation.

The Iconoclastic Controversy. Europe was now at liberty to work out independently a culture of its own, and in this task the papacy took the lead. Curiously enough, the Iconoclastic Controversy, which broke out in 726, offered the opportunity. The question raised was whether or not painted and sculptured images of God, Christ, the Virgin, and the saints were to be used in worship. From the beginning, it had

been customary to have such statues in the churches. In the catacombs of Rome, for example, crucial events and the central figures of the Christian religion were depicted on the walls. But Christians generally understood that, although it was proper to use pictures and statues as aids to the religious imagination, such images were not the object of worship. No doubt some Christians failed to observe this distinction and paid excessive devotion to images. Such devotion was called "iconduly" by those who regarded it as superstitious.

Leo the Isaurian was vigorously opposed to "image worship," perhaps influenced by the Mohammedan abhorrence of any representation of human beings. He cited the Fourth Commandment and proceeded on the basis of his own authority in religious matters. This authority was called "caesaropapism," as we have related earlier. He declared, "I am priest no less than emperor," and issued an edict in 726 ordering the removal of images. There was much opposition, for people, including the monks, were devoted to images. The Patriarch of Constantinople flatly refused to sanction the emperor's decree and was finally put to death. There also were demonstrations, and an attempt was made to deprive Leo III of his throne.

The bishop of Rome, the Pope, was in theory at least a subject of the emperor of Byzantium. All Italy was regarded as a part of the Byzantine Empire in spite of the fact that the Lombards, a German tribe, beginning in 567 had conquered large sections of the peninsula. Only the parts around Venice, Ravenna, Genoa, Perugia, Rome, and Naples, the southern shore line, and Sicily remained in Byzantine hands. Notwithstanding his inability to maintain order in Italy, the emperor commanded Gregory II, Pope from 715 to 731, to remove the images in the churches under his jurisdiction. "If you send troops for the destruction of the images of St. Peter, look to it," the Pope wrote to the emperor, and he meant what he said.

This controversy involved an old question—the freedom of religion. In Byzantium the emperor was able to dictate to the church; but in the West men were unwilling to concede such powers to princes. Furthermore, they believed it was the function of the church, not the state, to define what constituted the true Christian religion. Consequently Gregory III, Pope from 731 to 741, refused to obey even when Leo sent a fleet for his arrest. Though the attempt failed only because a storm ruined the fleet, an independent position had been assumed. Ever afterward during the Middle Ages, the church insisted that it was a religious institution separate from and independent of political organizations, whose ethical acts and religious policies it had a right to criticize. The church thenceforth became a chief agency in the formation of the temper peculiar to medieval culture.

THE PAPACY AND THE CAROLINGIANS. The position of the papacy in Italy was further threatened by the Lombards, whose king was ambitious to annex the yet unconquered parts of the peninsula. The Pope feared that he might establish himself in Rome and dictate the policy of the church. It seemed that, in the future, popes might not be so free as had been Gregory the Great to convert pagans and Arian Christians to the Catholic faith or as Gregory II and Gregory III had been to resist the emperor on the question of images. Perhaps the popes would not dare to assert stoutly that the church as a religious institution was free from political dictation. In the urgency of the situation, it was decided to appeal to the Carolingian mayors of the palace in Frankland. There was a possibility of sympathetic interest and support. The founder of the Carolingian family, the pious St. Arnulf, had been bishop of Metz. Charles Martel had routed the Arabs at Tours in 732, and so saved Christendom from a Mohammedan inundation. So the Pope appealed to Charles Martel. But Charles, who was a cautious man, hesitated to go to Italy to fight the Lombards.

However, Pepin the Short, son of Charles Martel, responded when the Pope turned to him. His brother Carloman, a religious man who preferred to be a monk and had retired to a Benedictine monastery near Rome, acted as intermediary between the Pope in Rome and the mayor of the palace in Frankland. Pepin had need of papal help, for he wanted to put an end to the anomalous relationship between the Merovingian king and himself as mayor of the palace. He wished to depose the phantom king who could not govern, but before taking so drastic a step he thought it wise to gain the support of the archbishops, bishops, and abbots of Frankland. Even better would it be to secure the help of the Pope himself, the head of the entire church. Pepin sent an envoy to the Pope to ask whether the person who carried the burden of the realm should be deprived of the authority of a king. Thinking perhaps of Charles Martel's services to Christendom on the field of Tours, the Pope was not long in answering. Perhaps he reflected on the fact that the rulers of the Merovingian line had never shown themselves eager servants of the church. Perhaps he dreamed of the help and support that he might possibly secure in the future from the mayor of the palace. At any rate, he answered that it was right that Pepin be king in name as well as in fact.

Accordingly, Pepin the Short proceeded with his plans. The Frankish nobility met at Soissons in 751 and elevated him to the kingship. St. Boniface, the missionary to Germany, was present and anointed Pepin, as the prophet Samuel in biblical times had anointed David. This ceremony, borrowed from the Old Testament, showed that the king ruled with divine approbation. Such religious support was desirable

for Childeric, the last of the Merovingian line, still enjoyed the patriotic affection of his subjects in spite of his political incompetence.

Soon Pope Stephen II had occasion to ask the newly elevated king for help. The Lombards continued their aggressions, and the Pope, realizing it was useless to appeal to Byzantium, hurriedly crossed the Alps in the winter of 754. Pepin received him at Bar-le-Duc in Lorraine and promised to force the Lombard king to return to the see of Rome its legitimate possessions, which lay between the Adriatic and Mediterranean seas and northward from Naples to the Po River. A great meeting of the Frankish nobility was held in 754 at St.-Denis, a Benedictine monastery just north of Paris, with Pope Stephen II present. He anointed Pepin, his queen Bertrada, and his sons Carloman and Charles, later famous as Charlemagne. Further, he guaranteed support of the new royal house, threatening persons who should seek to depose it with interdict and excommunication. Pepin, who no doubt was grateful, used his power to restore the possessions that the Lombard king had seized. He made two successful expeditions into Italy, the first in 754 and the second in 756, and effectively established the Papal State of Italy with the Pope as secular head.

Was there justification for the Pope's desire to rule a state, like a secular prince? The Pope had only lately resisted the efforts of the Byzantine emperor to impose his will upon the Western church in the matter of images on the grounds that the head of the church might fall under the power of secular princes who in such a case might be tempted to use him for their own selfish purposes. To create an independent state ruled by the Pope would seem to eliminate such a danger, guarantee a free church. This seemed a sufficient justification for the Pope's desire, but unfortunately this solution of the problem was not a completely successful one. The Pope might become a politician. A worse danger was the possibility that he might become the plaything of the ambitious nobles over whom he ruled. All these difficulties arose at one time or another; but, whatever its virtues or faults, the Papal State did survive until 1871, a long life in the history of any political society.

Zeal for religion and respect for the church guided the Carolingians. Charles Martel had shown interest in the missionary career of St. Boniface and his work among the Germans east of the Rhine, still pagan in spite of the work of men like St. Columbanus. St. Boniface, born in England, continued the work of his fiery Celtic predecessors. He went to Germany in 716 and began vigorously the work of conversion. Groves sacred to the gods were hewn down and places of pagan worship destroyed. In their stead, parishes were created, dioceses organized, and monasteries founded. Germany between the Alps, the North Sea, the Rhine, and

the Slavic lands to the east, with the exception of Saxony, was converted by St. Boniface, who had the constant support of Pepin.

The Merovingian kings had neglected the welfare of the church in Frankland, appointing bishops and abbots with scant regard to their religious qualifications. Many priests spent their time in hunting, carried weapons, married, and were mediocre in learning and languid in devotion. There was no discipline, and as a result the church's prestige sank. Realizing the need for a reform, Pepin and his brother Carloman resolved to remedy the condition. St. Boniface was invited to Frankland, and, beginning in 742, a series of councils were held. The clergy were required to lead exemplary lives, give up hunting and the carrying of weapons, and seriously look after the interests of the church. Episcopal and abbatial establishments began to flourish. As a result of the protection of Pepin and his brother and the energy of St. Boniface, the church rapidly gained prestige. Finally, in 755, the saint met martyrdom at the hands of pagan Frisians. His body was carried to Fulda, where he had established a monastery.

CHARLEMAGNE. Pepin the Short died in 768 and was succeeded by Charlemagne, who ruled from 768 to 814. Charlemagne's commanding personality is sketched by Eginhard in his *Life of Charlemagne.*

> Charles was large and strong, and of lofty stature, though not disproportionately tall (his height is well known to have been seven times the length of his foot); the upper part of his head was round, his eyes very large and animated, nose a little long, hair fair, and face laughing and merry. Thus his appearance was always stately and dignified, whether he was standing or sitting; although his neck was thick and somewhat short, and his belly rather prominent; but the symmetry of the rest of his body concealed these defects. His gait was firm, his whole carriage manly, and his voice clear, but not so strong as his size led one to expect. His health was excellent, except during the four years preceding his death, when he was subject to frequent fevers; at the last he even limped a little with one foot. Even in those years he consulted rather his own inclinations than the advice of physicians, who were almost hateful to him, because they wanted him to give up roasts, to which he was accustomed, and to eat boiled meat instead. In accordance with the national custom, he took frequent exercise on horseback and in the chase, accomplishments in which scarcely any people in the world can equal the Franks. He enjoyed the exhalations from natural warm springs, and often practised swimming, in which he was such an adept that none could surpass him; and hence it was that he built his palace at Aix-la-Chapelle, and lived there constantly during his latter years until his death. He used not only to invite his sons to his bath, but his nobles and friends, and now and then a troop of his retinue or body-guard, so that a hundred or more persons sometimes bathed with him.

Such was the imposing physical appearance of the prince who ruled not only the Franks between the Rhine and the Pyrenees, but also the

Lombards in Italy, whom he subdued in 774. Even the Papal State came under his control. He conquered the Saxons in northern Germany between the Elbe River and the lands inhabited by the Frisians, annexed the region occupied by the Bavarians, and pushed the eastern boundary of his realm along the Oder River to include Bohemia, Moravia, Pannonia, and Croatia. In Spain he possessed the Spanish March, which embraced half the land between the Ebro River and the Pyrenees Mountains and included the city of Barcelona.

To the people of the time, Charlemagne appeared as great a ruler as any of the ancient Roman emperors. His kingdom was in fact larger than any yet formed by previous Germanic kings. The Roman Empire seemed to be the greatest and noblest state that mankind had ever established. It was characteristic throughout the Middle Ages to regard it as a utopia. Medieval people always compared their civilization with that of the Greco-Roman world, usually to the disadvantage of their own, voicing a melancholic homesickness for the vanished empire of Rome. This yearning made it easily possible to "restore" the "empire" in the year 800.

There was much confusion in the Papal State at this time. To be sure, the Pope was free in his political policy; for although Charlemagne possessed a vague authority over him, he did not interfere in his affairs. But the Pope was troubled by ambitious and turbulent nobles who wanted to use the church for their own advantage. There was much strife; on one occasion, some nobles attacked the Pope and attempted to mutilate him. The Pope thereupon appealed to Charlemagne, who went to Rome, set affairs in order, and restored papal authority. Charlemagne thus showed himself a loyal servant of the church and a firm friend of the Pope. To many among the Pope's followers, he appeared a veritable Augustus.

On Christmas Day, in the year 800, during the service in St. Peter's the Pope crowned Charlemagne. The crowd inside and outside shouted, "To Charles Augustus, crowned by God, great and pacific emperor of the Roman people, life and victory!" Thenceforth, Charlemagne was not only king of the Franks and Lombards, but also "emperor." The new dignity gave him immense prestige, for it elevated him above other princes. However, it added little power and did not enhance his economic resources, for there was no imperial taxation, governmental organization, or army. But this revived Roman Empire, as it was supposed to be, nevertheless proved to be the beginning of that so famous medieval institution, the Holy Roman Empire.

Even though the new empire possessed little military or financial power, it was to be a significant force in the life and thought of succeeding generations. It gave expression to the desire that some organization

should embrace all mankind to establish peace and security. At times the Empire was effective, but toward the close of the Middle Ages its power declined. In modern times, it lingered on feebly and finally foundered during the wars of Napoleon. It vanished because people seemed to have lost interest in such a universal institution. Repeatedly, however, during the past century men have tried to come together in a common institution to curb their costly struggles. This was the basic purpose of the Hague Tribunal and the ill-starred League of Nations.

Though founded auspiciously with every hope of a great future, the kingdom and the grandiose empire created by Charlemagne were not destined to endure, encountering too many adversities almost from the great ruler's death. His grandsons—Lothaire, Louis, and Charles—quarreled over their share in the inheritance even before the death of their father Louis, son of Charlemagne and emperor from 814 to 840. Because the crown in the Carolingian state, as in the Merovingian, was regarded as a private possession, they had no scruples but fought desperately for the best properties. The three contenders finally partitioned the realm in what is known as the Treaty of Verdun (843). This did not lay their dissensions, however, and their exhausting wars continued. Ruin was inevitable; the ambitious nobles as landlords seized the government of the counties and set up independent feudal states. The invasions of Norsemen, Arabs (Saracens), and Magyars, adding to the confusion and misery, encouraged the decline. Finally two kingdoms—France and Germany—emerged, weakened and reduced in territory, mere shadows of Carolingian greatness.

Many vestiges of Carolingian institutions remained. But important as these proved in the future history of western Europe they scarcely compared with the intellectual impetus imparted by Charlemagne and continued with indifferent interest by his immediate successors. Charlemagne had favored monasteries and churches; their strength was such that the church thenceforth became the sure guardian of the intellectual and moral leaven about to transform the cultural life of Europe.

Charlemagne's personality dominated the early Middle Ages. Not only did he create the Carolingian state and revivify the ideal of empire, but in intellectual matters he introduced a new era. He combined his achievements in politics and intellectual culture with the Christian faith. Eginhard gives the following description of Charlemagne's intellectual interests:

> While at table, he listened to reading or music. The subjects of the readings were the stories and deeds of olden time: he was fond, too, of St. Augustine's books, and especially of the one entitled "The City of God." . . . [He] had the gift of ready and fluent speech, and could express whatever he had to say with the

utmost clearness. He was not satisfied with command of his native language merely, but gave attention to the study of foreign ones, and in particular was such a master of Latin that he could speak it as well as his native tongue; but he could understand Greek better than he could speak it. He was so eloquent, indeed, that he might have passed for a teacher of eloquence. He most zealously cultivated the liberal arts, held those who taught them in great esteem, and conferred great honors upon them. He took lessons in grammar of the deacon Peter of Pisa, at that time an aged man. Another deacon, Albin of Britain, surnamed Alcuin, a man of Saxon extraction, who was the greatest scholar of the day, was his teacher in other branches of learning. The king spent much time and labor with him studying rhetoric, dialectics, and especially astronomy; he learned to reckon, and used to investigate the motions of the heavenly bodies most curiously, with an intelligent scrutiny. He also tried to write, and used to keep tablets and blanks in bed under his pillow, that at leisure hours he might accustom his hand to form the letters; however, as he did not begin his efforts in due season, but late in life, they met with ill success.

Eginhard also describes Charlemagne's preoccupation with religion, which endeared him to the churchmen of the day.

He cherished with the greatest fervour and devotion the principles of the Christian religion, which had been instilled into him from infancy. Hence it was that he built the beautiful basilica at Aix-la-Chapelle, which he adorned with gold and silver and lamps, and with rails and doors of solid brass. He had the columns and marbles for this structure brought from Rome and Ravenna, for he could not find such as were suitable elsewhere. He was a constant worshiper at this church as long as his health permitted, going morning and evening, even after nightfall, besides attending mass; and he took care that all the services there conducted should be administered with the utmost possible propriety, very often warning the sextons not to let any improper or unclean thing be brought into the building, or remain in it. He provided it with a great number of sacred vessels of gold and silver, and with such a quantity of clerical robes that not even the doorkeepers, who fill the humblest office in the church, were obliged to wear their every-day clothes when in the exercise of their duties. He was at great pains to improve the church reading and psalmody, for he was well skilled in both, although he neither read in public nor sang, except in a low tone and with others.

Like his father, Charlemagne was eager to extend the Christian faith. Not all the Germans had been Christianized by the labors of St. Boniface. The Saxons still clung to their ancient paganism; their stubborn loyalty to their gods was not broken until Charlemagne forced them to receive baptism. He divided their country into parishes and dioceses. Monasteries were established, and soon the Saxons were loyal Christians. Missionary effort was extended also to the Germanic peoples of Scandinavia, who were especially reluctant to abandon their pagan faith. In 826, St. Ansgar began his missionary work in Denmark, but he had little success. The three countries of Scandinavia—that is, Denmark,

Sweden, and Norway, which came to include Iceland and Greenland—did not embrace Christianity until about two centuries later.

SCHOOLS OF IRELAND. The "renaissance" with which Charlemagne's name is so intimately associated was founded upon the labors of such men as Boethius, Cassiodorus, and Isidore of Seville and, especially, upon the work of the Irish schools. These schools became widely influential in the intellectual life of Europe when the Celtic, or Irish, church joined the Roman.

In its inception, Celtic Christianity differed from the Roman not only in organization but also in liturgy. For one thing, it did not observe Easter at the time the Roman church did. Since the date of Easter determined the date of Lent and all movable festivals, there resulted much variation. Celtic and Roman missionaries often clashed. Finally, a meeting, the Synod of Whitby, was held in England in 664. It was there decided that the ways of the Roman church were proper, and they were adopted. Thus the Celtic joined the Roman church, and both thereby gained religious and intellectual strength.

There had been little sustained study and teaching in the schools before the time of Charlemagne. It is true that Cassiodorus had set a shining example in his monastery at Vivarium, and Benedictine houses began to follow his example. But systematic teaching on an extensive scale was to be found only in the schools of Ireland, which became the most important educational centers of the Dark Ages. The Irish were a pious people, showing deep attachment to the Christian faith after their conversion by St. Patrick (*d.* 461). They spoke Celtic; Latin was for them a foreign tongue, but they studied it in order to read the Vulgate and the Church Fathers. They eagerly read the poems of Vergil and Ovid in spite of their pagan spirit. From the beginning the Latin classics were studied zealously in the Irish schools established in connection with monasteries. Of these, Clonard, Kells, and Bangor were but a few of the more famous. Their purpose was to prepare men to serve the church by celebrating Mass, reading Scripture, acting as missionaries, and teaching the Christian religion. Grammar was studied with great care, and the other branches of the trivium and the quadrivium also received attention. Scripture was interpreted allegorically after the fashion of Gregory the Great in his *Magna moralia*. Occasionally, Irish monks learned Greek, but this was exceptional.

Irish scholarship spread far beyond Ireland and constitutes the most important example of intellectual activity in western Europe from 600 to 800. Wherever Irish missionaries established a monastery, a school was likely to spring up. The school at Bobbio in the Apennines was long noted for its learning and its library. Two famous schools at St. Gallen and Reichenau in Switzerland sheltered many a studious

monk. An Irish monk who lived in a monastery in Carinthia in the ninth century diverted himself by comparing his tasks with that of his favorite cat Pangur Ban.

I and Pangur Ban, my cat
'Tis a like task we are at;
Hunting mice is his delight,
Hunting words I sit all night.

Better far than praise of men
'Tis to sit with book and pen;
Pangur bears me no ill will,
He too plies his simple skill.

'Tis a merry thing to see
At our tasks how glad are we,
When at home we sit and find
Entertainment to our mind.

Oftentimes a mouse will stray
In the hero Pangur's way;
Oftentimes my keen thought set
Takes a meaning in its net.

'Gainst the wall he sets his eye
Full and fierce and sharp and sly;
'Gainst the wall of knowledge I
All my little wisdom try.

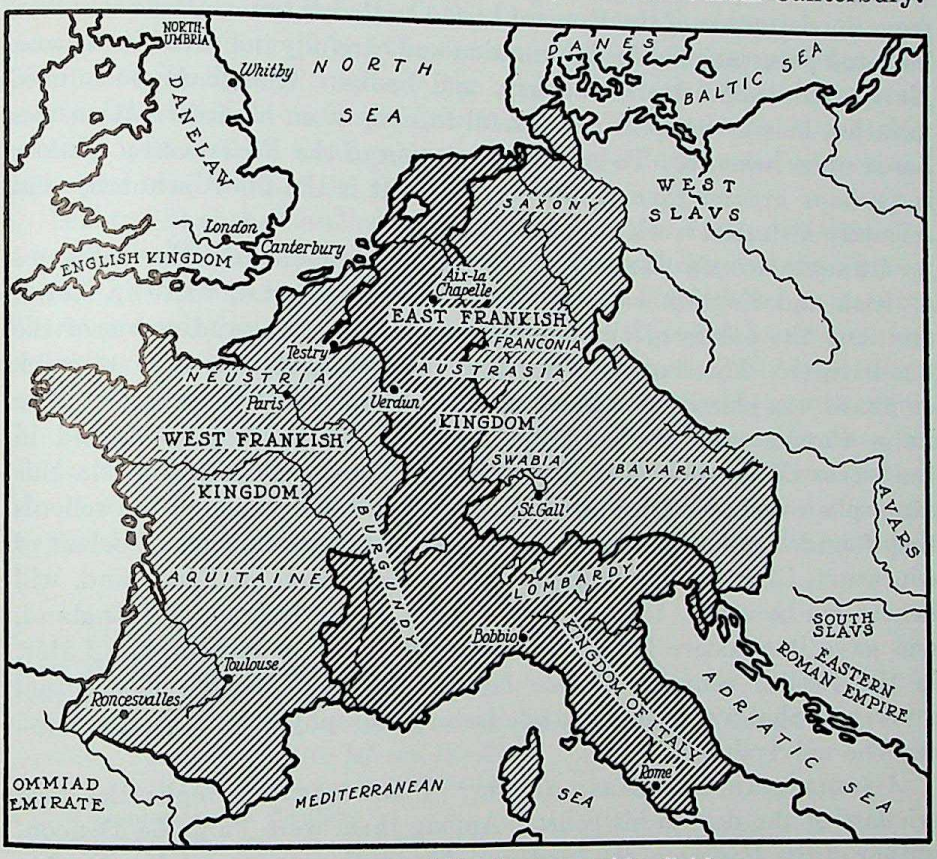
When a mouse darts from its den,
O how glad is Pangur then!
O what gladness do I prove
When I solve the doubts I love!

So in peace our task we ply,
Pangur Ban, my cat, and I;
In our arts we find our bliss,
I have mine and he has his.

Practice every day has made
Pangur perfect in his trade;
I get wisdom day and night,
Turning darkness into light.[1]

[1] Mr. Robin Flower's translation, published in Eleanor Hull's *The Poem Book of the Gall*, pp. 132–133, Chatto & Windus, London, 1912.

Anglo-Saxon Schools. Important as the Celtic schools proved to be, they were surpassed by those of Northumbria in England. Both Irish and English missionaries had carried the torch of learning into Northumbria after its conversion by St. Paulinus in 627. At Canterbury, where St. Augustine had begun his missionary work, a noteworthy school had sprung up. Monasteries were founded at Wearmouth and Jarrow in Northumbria by Benedict Biscop (*d.* 690), who came from Canterbury.



Map XXI.—Empire of Charlemagne and its divisions.

Books were collected and carefully studied. Soon the entire body of learning that had survived the decline of the Roman Empire was mastered in these houses.

It was Northumbria that produced the Venerable Bede (*d.* 735), the greatest scholar of the Dark Ages. He spent his life in the monastery at Jarrow as monk, teacher, and writer—a career typical of many Benedictine monks who lived in the monastery where they took their vows. His writings embrace the topics studied in the trivium and quadrivium; but Bede was particularly interested in the problem of dating events, being one of the first to date them "in the year of our

Lord." He wrote several lives of saints, a collection of martyrs' lives, a book of hymns, and a number of commentaries. These practical books for students, read far and wide, were most important for the intellectual development of the Middle Ages but are no longer used.

One of Bede's writings, however, was destined to hold a foremost place in literature—the *Ecclesiastical History of the English People*. This work is the only account we have of the dark period of English history from the departure of the Romans in 410 to Bede's time. Bede searched long and painstakingly for information and carefully indicated its source. He quoted from letters, charters, and books. Though he recounted miracles, he was scrupulously careful to note when his information was based upon hearsay. Today the reputation of the *Ecclesiastical History* is perhaps greater than it has ever been; it is the finest scholarly and scientific historical work of the Dark Ages.

Charlemagne's Schools. Carolingian schools felt the influence of Irish and English learning. Boys learned to read, write in Latin, and sing the offices of the church, and acquired the rudiments of the quadrivium. Theology and Scripture were taught, but not so much emphasis was placed upon them as was customary in Irish schools. The Latin classics were studied, Charlemagne himself being interested in the works of Vergil and St. Augustine of Hippo. Boys trained in this atmosphere were chosen to be bishops and abbots. Some of the schools they founded produced learned men. By using his influence in behalf of education, Charlemagne brought to France (as Gaul, or Frankland, will henceforth be called) the learning of Italy, Spain, Ireland, and England, and gave it a secure home in his monasteries and cathedrals. Later, in the twelfth century, France became the home of the intellectual awakening that was to produce scholastic philosophy, scholastic theology, and the universities.

Carolingian Scholars: Alcuin. Charlemagne brought the best scholars of the day to his court. Among them were Paul the Deacon, author of the *History of the Lombards*, Theodulf, a poet, and Angilbert, a learned scholar and collector of books. But the greatest of all was Alcuin (*d.* 804), an Englishman born in the year of Bede's death (735). He was educated at York—at that time the leading school in Christendom—and there assumed control of the teaching and the library. Charlemagne invited him to take charge of his Palace School and become director of the King's educational policies. In 796 he was appointed abbot of Tours, a monastery with a distinguished school especially noted for the development of handwriting. For some time the English had been improving their handwriting, having borrowed many of its features from Irish handwriting. As it was clear and easy to read compared with the handwriting used on the Continent, Alcuin introduced it into the Benedictine

monasteries of France. The new style, called the Carolingian minuscule, was the forerunner of medieval handwriting and the Roman type, which appeared at the close of the Middle Ages. As a scholar, Alcuin mastered the liberal arts as well as the Scriptures. Although his writings are numerous, his real greatness is in his work as a practical teacher.

EGINHARD. The greatest literary work of the Carolingian Age is Eginhard's *Life of Charlemagne*. Eginhard (*d.* 840) had been a pupil at the Palace School and became Charlemagne's councilor, companion, and secretary. His biography of Charlemagne was modeled upon Suetonius's *Lives of the Caesars*, a tribute to the zeal with which Charlemagne and his friends studied classical Latin writers. The little book contains pleasing pictures of Charlemagne and many allusions to intellectual and other conditions of the times.

It is true that the Carolingian renaissance was not strikingly original—if by originality we mean the creation of new knowledge and the blazing of new intellectual trails. Times were not ripe for such achievements. We must remember that the culture of the Dark Ages was based upon an agricultural economy and that the people, even priests and bishops, were largely illiterate. In such a society it was more important to preserve the knowledge of the past and keep the light of learning aglow than to create new knowledge. Let us not belittle the work of these times. Much was saved from the wreckage of ancient learning, and so were prepared the foundations for an intellectual revival in the twelfth century.

FOR FURTHER READING

BAKER, G. P.: *Charlemagne*
DAVIS, H. W. C.: *Charlemagne*
DAWSON, CHRISTOPHER: *The Making of Europe*
DOPSCH, ALFONS: *The Economic and Social Foundations of European Civilization*
GASKOIN, C. J. B.: *Alcuin: His Life and His Work*
GOUGAUD, DOM LOUIS: *Christianity in Celtic Lands*
KURTH, GODEFROID: *St. Boniface*
LAISTNER, M. L. W.: *Thought and Letters in Western Europe, A.D. 500–900*
MOSS, H. ST. L.: *The Birth of the Middle Ages, 395–814*
PIRENNE, HENRI: *Belgian Democracy*
———: *Economic and Social History of Medieval Europe*
———: *Mahomet and Charlemagne*
———: *Medieval Cities and Commerce*
RAND, E. K.: *Founders of the Middle Ages*
RYAN, JOHN: *Irish Monasticism: Origins and Early Development*
SINGER, C. J.: *From Magic to Science*

Chapter XXI

THE ORIENT IN MEDIEVAL TIMES

The Indian thinkers were incomparable students of metaphysical philosophy. Their unerring instinct for that which is worth knowing for its own sake led them to despise all treasure excepting truth.—Siegfried Behn

BEFORE proceeding with the delineation of medieval European culture after Carolingian times it is well to describe the civilization of India and China during the so-called "Dark Ages" of European history. Of the dynastic history of India after the close of Maurya rule in 185 B.C., we shall mention only the Gupta Dynasty, which reigned from about A.D. 320 to 480, because their rule marked a period of great material prosperity and governmental effectiveness. This was also an age of intellectual achievement and religious change under such rulers as Chandragupta I (*d.* 335), Samudragupta II (*d.* 345), and Chandragupta II (*d.* 413).

Indian Drama. Indian drama reached its fullest development in the works of Kalidasa. Nothing certain is known about Kalidasa's life, some asserting that he lived in the first century B.C. while others insist that he lived as late as the eleventh century A.D. Present-day scholarship, however, is inclined to place Kalidasa's literary career in the reign of Chandragupta II. The *Sakuntala* is Kalidasa's greatest creation. The heroine, the maiden Sakuntala, is the foster daughter of a hermit. King Dushyanta, driving past the hermit's lodge, notices Sakuntala and becomes violently enamored of her. They are married at once, but a summons causes the king to return, leaving Sakuntala with her foster father. Stricken with grief, Sakuntala is not so courteous as usual and offends a visiting hermit, who pronounces upon her a curse of forgetfulness by her husband. However, the hermit softens his harsh decree by saying that the king will remember her provided that she keeps his ring; but Sakuntala loses this while bathing. When about to become a mother, she goes to Dushyanta's court but is received with slight courtesy. The ring is found in a fish caught by a fisherman who is arrested for its possession. Meanwhile, Sakuntala's child—Bharata, the ancestor of one of the characters in the *Mahabharata*—is born. The king stops at the hermitage where Sakuntala has taken refuge after being repulsed, is attracted to the playful Bharata, and gradually recalls who Sakuntala is.

She is restored to her spouse, and we are led to believe that the couple live happily ever after.

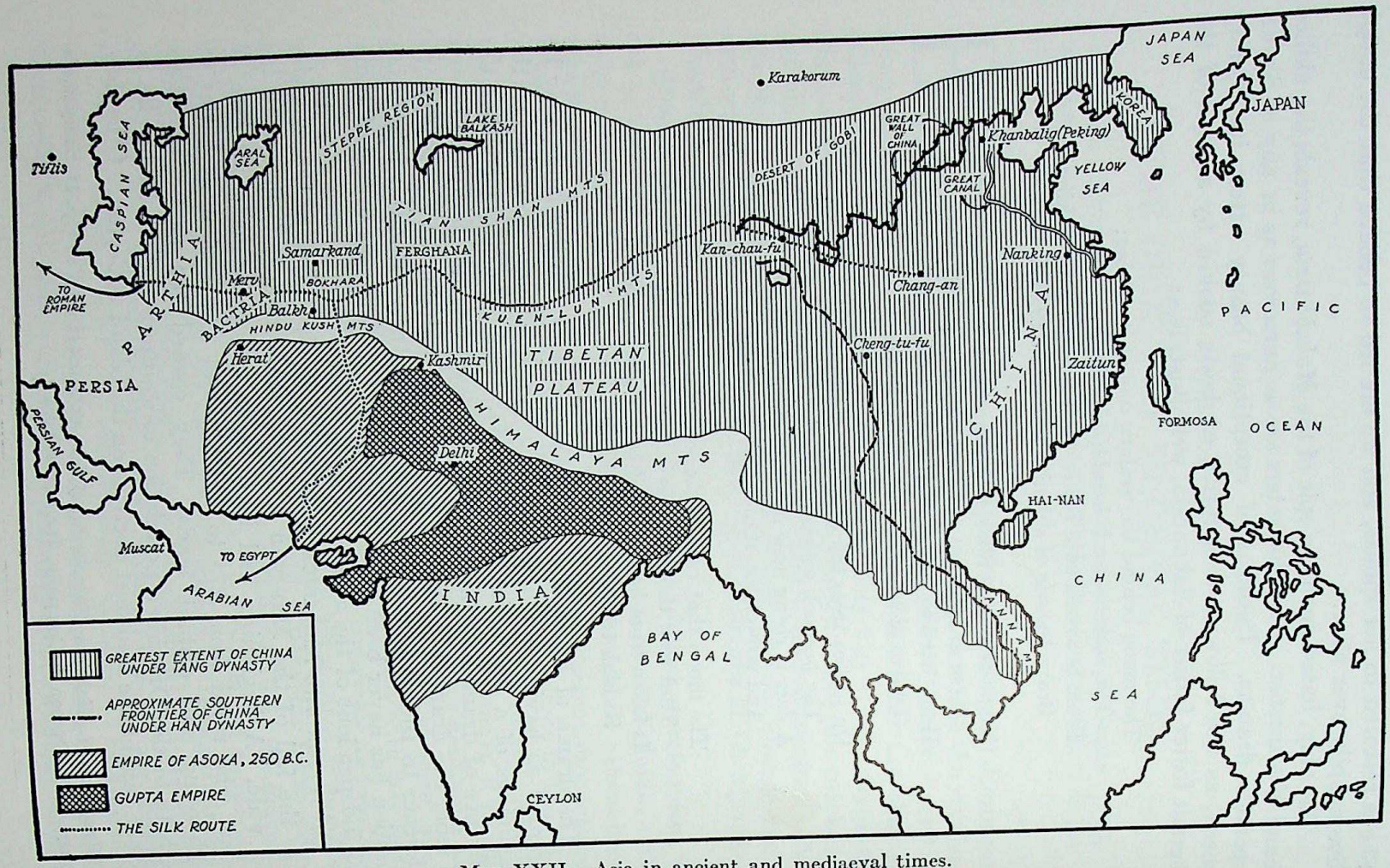
The play, based upon the epic of the *Mahabharata*, reveals the skilled hand of a master. The characters are as numerous as in any of Shakespeare's dramas. Passages of exceptional beauty attest its literary merit, as the following description of dawn, spoken by a pupil of the hermit foster father of Sakuntala, well illustrates:

> The moon behind the western mount is sinking;
> The eastern sun is heralded by dawn;
> From heaven's twin lights, their fall and glory linking,
> Brave lessons of submission may be drawn.
>
> Night-blooming lilies, when the moon is hidden,
> Have naught but memories of beauty left.
> Hard, hard to bear! Her lot whom heaven has bidden
> To live alone, of love and lover reft.
>
> On jujube-trees the blushing dewdrops falter;
> The peacock wakes and leaves the cottage thatch;
> A deer is rising near the hoof-marked altar,
> And stretching, stands, the day's new life to catch.
>
> The moon that topped the loftiest mountain ranges,
> That slew the darkness in the midmost sky
> Is fallen from heaven, and all her glory changes:
> So high to rise, so low to lie![1]

The drama of India, like that of Greece and of other lands, may be regarded as having a religious origin. Some scholars even discern the beginnings of a drama in the Rig-Veda. It has been argued that the influence of dramatists like Aeschylus, Sophocles, and Euripides helped to mold the drama of India on the premise that this is as possible with reference to Indian drama as to Indian sculpture. But this interesting question has never been settled. In all probability, the drama of India was independent of the drama of the Greeks.

Diffusion and Modifications of Buddhism. During the centuries after the fall of the Mauryan Dynasty the Buddhist faith spread far and wide. A beginning had been made under the fostering care of Asoka, who ruled from 273 to 232 B.C. and who sent missionaries to neighboring and distant lands. They carried the gentle Buddha's teaching to the Dravidian population of southern India. Mahendra in 250 B.C. taught the Buddhist doctrine on the island of Ceylon. Other fol-

[1] Ryder, A. W., *Kalidasa; Translations of Sakuntala and Other Works*, p. 41, Everyman's Library, E. P. Dutton & Company, Inc., New York.



MAP XXII.—Asia in ancient and mediaeval times.

lowers of the Buddha took his teachings to Burma, Siam, and Cambodia. The introduction of Buddhism into these and neighboring lands marks the beginning of a more intense cultural development. This was especially true of the backward inhabitants of Central Asia. It was a distinct gain for those peoples to accept the Buddhist *karma*, the law of cause and effect, in place of magic, animism, taboos, and capricious gods whose imperious will had to be placated by blood sacrifices. Buddhist monks supplanted sorcerers and shamans; the conversion of these peoples marks an epoch in the history of Asiatic civilization.

Meanwhile, Buddhist teaching itself underwent profound modifications. For six or seven centuries the monks adhered closely to the original teachings, but gradually the Buddha's philosophy became transformed into an elaborate set of beliefs. Images of the Buddha and his chief disciples were set up in stupas; gradually, worship was accorded to the Buddha and even to his followers. The monks, to be sure, kept to the old practice of meditation; but the common people, whose minds teemed with polytheistic conceptions, offered flowers and fruits to images, burned incense and tapers, and uttered prayers of praise and adoration. This stage of development in Buddhism was attained by the second century A.D. and has persisted to this day in Burma and Ceylon. It is known as *Hinayana*, or "lesser vehicle," Buddhism.

Still greater was the departure that took place in Buddhist teaching in northwestern India during the first century A.D. A migratory nomadic people called Kushans from Central Asia invaded Gandhara and extended their power over the lands west of the Indus River, Kashmir, and adjacent parts and founded the realm of Kusana, or Kushan. Its ruler Kanishka (*d.* 125), who governed his lands from Peshawar, was a versatile man who appreciated the superior civilization of India, but he would not adopt Brahmanism because of its all too rigid system of castes. Instead, he preferred the thought of the Buddha and became a follower of the great teacher. Kanishka's influence resulted in an extension throughout Central Asia and India of the new *Mahayana*, or "greater vehicle," Buddhism.

The distinctive feature of the new Mahayana Buddhism was its borrowing from Brahmanism. Behind all we behold is the Universal Spirit—a spirit believed to be incarnate in the Buddha and in his monks. Formerly, a monk through meditation sought to become a perfect man who, upon death, would enter *nirvana*. Now, however, such men became "bodhisattvas"—men who might enter nirvana but who preferred to remain incarnations of the Universal Spirit and through such self-denial to become a kind of divinity to help suffering humanity. In Mahayana Buddhism the Buddha and bodhisattvas were saviour divinities, objects

of an elaborate system of worship. Buddhist places of meditation became impressive centers of worship, altars were set up and monks became priests, prayers were composed for Buddhist divinities, and a complicated ritual evolved. Robes, incense, relics, processions, paintings, sculptures, and banners became indispensable accessories to the temple ritual. Thus Buddhism accommodated itself to the polytheistic conceptions of Hindus and other peoples. Starting as a simple agnostic philosophy, Buddhism in its Mahayana form finally became a polytheistic religion.

Thus transformed, Buddhism spread far and wide into Central Asia, especially along the trade routes. Chinese pilgrims came to India to visit stupas, pray in temples, and read the sacred books of Buddhism. One such pilgrim was Fa-Hsien, who between 399 and 415 visited India, coming through Khotan and Gandhara and returning by way of Java and the Malay Peninsula. More important was Yuan Chuang, who went to India in 630 to study Buddhist texts and visit the spots made holy by association with the Buddha's life. Like Fa-Hsien, Yuan Chuang traveled from China along the trade route through Turkestan, entered India by way of Gandhara, and stayed until 645. He produced an interesting account of Hindu life and society. Of the devotees of the Hinayana and Mahayana Buddhist doctrines he wrote, "Learning and discussing, they found the day too short, day and night they admonished each other, juniors and seniors mutually helping to perfection." Pilgrims and missionaries thus carried Buddhism to China, whence it spread to Korea and Japan during the fifth century.

Buddhism also appeared in the East Indies, for there were constant commercial relations between India and Java, Sumatra, Bali, and the Moluccas. The early history of the inhabitants of these islands is wrapped in darkness. Probably their religious development was like that of other primitive cultures of eastern Asia. Brahmanism, introduced at an early date, was followed by Buddhism, a fact noted by Fa-Hsien when he stopped at Java in 414 on his return to China. Another Chinese pilgrim I Ching visited Sumatra in 671 and 699 and found more than a thousand Buddhist monks at Palambang. The most remarkable Mahayana Buddhist monument in Java is at Boroboedoer. This vast structure was designed to perpetuate in carved stone the teachings of the Buddha and stories about the lives of some of the bodhisattvas. The site is ideal—a conical hill surrounded by an expanse of rice fields and bamboo and palm trees, with volcanoes in the distance. A stupa surmounts seven stone terraces, the walls of which are adorned with more than a thousand sculptured scenes.

Transformation of Brahmanism. While Buddhism thus underwent profound modifications, equally significant transformations took

place in Brahmanism. Beginning with the fall of the Maurya Dynasty in 185 B.C., Brahmanism reached its fullest development by the eighth century A.D. The Hindus gradually lost interest in Indra, the popular divinity in the Rig-Veda. The ascetic and contemplative cults of Jainism and Buddhism never satisfied the masses. Even Mahayana Buddhism with its polytheistic tendencies failed in this respect. The Brahman priests tried to compete with the Jainists and Buddhists by evolving a practical system of worship. The older gods receded into the background, and a triad composed of Brahmā, Vishnu, and Siva came to the fore. Brahmā, or the god in the role of creator, was popular for a time; but he too passed into the background, and Vishnu, the creator, and Siva, the destroyer, thenceforth received the devoted attention of Hindus. The former, a kindly god ready to help mortals, was adored; the latter, a terrible divinity of destruction, was worshiped, and frantic efforts were made to placate him. The stories about Vishnu and Siva are collected in a series of mythological tales, eighteen in number, known as the *puranas*.

Hinduism is difficult for a Westerner to understand. It is not a systematic doctrine but a loose collection of religious practices, teachings, and mythological tales. The Hindus believe in karma, transmigration, and caste—all concepts strange to the Western mind. The better instructed Hindus are philosophic, believing in a Universal Spirit that manifests itself in many forms. The innumerable divinities are believed to be manifestations of the all-pervading divine energy of the Universal Spirit. Belief in incarnation is universal, and Vishnu, incarnate in the form Krishna, has become exceedingly popular.

THE BHAGAVAD-GITA. The *Bhagavad-Gita*, or *Song Celestial*, a long poem interpolated in the text of the *Mahabharata* about A.D. 200, is profoundly philosophical. Its purpose is to exalt the worship of Krishna, who describes his own attributes in the following verses:

I am the ancient sage, without beginning,
I am the Ruler and the All-sustainer,
I am incomprehensible in form,
More subtle and minute than subtlest atoms;
I am the cause of the whole universe;
Through me it is created and dissolved;
On me all things within hang suspended,
Like pearls upon a string. I am the light
In sun and moon, far, far beyond the darkness;
I am the brilliancy in flame, the radiance
In all that's radiant, and the light of lights,
The sound in ether, fragrance in the earth,
The seed eternal in existing things,

The life in all, the father, mother, husband,
Forefather, and sustainer of the world,
Its friend and lord.

Krishna's glorious divinity draws the following rhapsody from the admiring Arjuna:

I see thee, mighty Lord of all, revealed
In forms of infinite diversity.
I see thee like a mass of purest light,
Flashing thy lustre everywhere around.
I see thee crowned with splendour like the sun,
Pervading earth and sky, immeasurable,
Boundless, without beginning, middle, end,
Preserver of imperishable law,
The everlasting man, the triple world
Is awe-struck at this vision of thy form,
Stupendous, indescribable in glory.
Have mercy, God of gods; the universe
Is fitly dazzled by thy majesty.

The *Bhagavad-Gita* contains many other beautiful passages. The following to Brahma well expresses the spirit of Brahmanism:

Darkness to dazzling day,
Look I whichever way;
Ah Lord! I worship thee, the Undivided,
The Uttermost of thought
The Treasure-palace wrought
To hold the wealth of the worlds; the Shield provided

To shelter Virtue's laws;
The Fount whence Life's stream draws
All waters of all rivers of all being:
The One Unborn, Unending:
Unchanging and Unblending!
With might and majesty, past thought, past seeing!

Of thy perfections! Space
Star-sprinkled, and void place
From pole to pole of the Blue, from bound to bound,
Hath thee in every spot,
Thee, thee!—Where thou art not,
O Holy, Marvelous Form! is nowhere found![1]

DEVELOPMENT OF HINDU ART: ARCHITECTURE. Although the art of India received a tremendous impetus from Buddhism, Brahman influ-

[1] *The Sacred Books and Early Literature of the East*, Vol. IX pp. 133, 163, Park, Austin, and Lipscomb, Inc., New York.

ences finally became predominant. Yet the architecture of Brahmanism was borrowed originally from Buddhism, and its temples were developed from Buddhist vinaras.

The Brahman temple has a square base, ornamented with pilasters. Over the shrine (*gopura*) rises a many-storied tower, pyramidal in

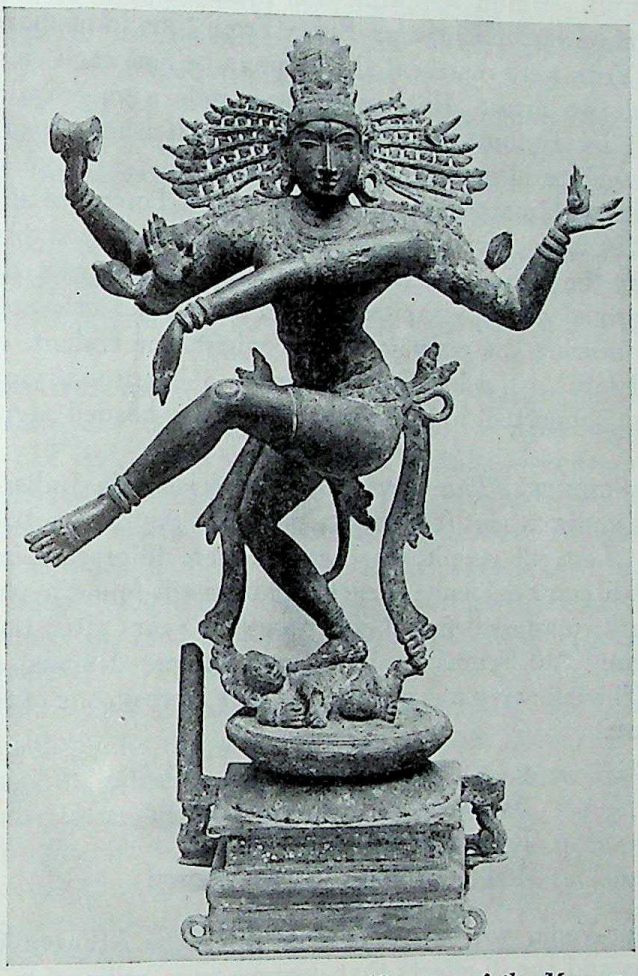


FIG. 56.—Dancing Siva, eighteenth century. (*Courtesy of the Museum of Fine Arts, Boston.*)

shape and surmounted by a small dome. Such a temple usually is surrounded by a court enclosed by a wall entered by a gate facing the shrine. The *gopura* is oblong, being twice as wide as it is deep, and, like the shrine, has numerous stories. Many such temples are of monumental proportions; the tower of the temple at Tanjore, erected after the year 1000, rises to a height of 190 feet. By the side of such a temple, within the enclosure, there is always a sacred tank or pool

used for ritual ablutions. Another type of Hindu temple consists of a rectangular cell housing the image of the god, the whole surmounted by a lofty steeple whose surfaces are decorated by vertical ribs. There are many such Indo-Aryan temples in northern India which in all probability developed from the original Buddhist stupa.

SCULPTURE. Hindu sculpture was profoundly modified during the first millennium of the Christian Era. From time immemorial the gods of the Rig-Veda were represented as human beings, each usually having a head and two arms. But when these gods were crowded into the background by Brahmā, Vishnu, Siva, and Krishna, a great change came over sculptural representations. Siva was portrayed as a plural-headed figure with many arms and feet that tread on unfortunate human beings. This figure, symbolizing destructive forces, was placed in the shrine facing the entrance. Brahmā was represented as a three-headed and three-armed god. Vishnu appeared with head crowned and with four hands bearing the emblems of his might, the trident, conch shell, discus, and lotus. Krishna was shown as a handsome youth playing a flute and supported by Amanta, the many-headed serpent of the world.

INDIAN SCIENCE. The development of science in India is obscure, but what is known about it warrants the belief that its contributions are important. Like all people, the Indians were interested in medicine. The earliest literary evidence of such an interest is found in the Atharva-Veda, a work composed probably a thousand years after the Rig-Veda and containing 730 hymns, really charms against demons, curses, and diseases. The following was intended to cure leprosy, one of the scourges of the Orient:

> Born in the night wast thou, O herb,
> Dark-colored, sable, black of hue:
> Rich-tinted, tinge this leprosy.
> And strain away its spots of gray!

The Ayur-Veda, written some time after the Atharva-Veda, deals with poisons and the ill effects that demons were believed to exert upon human beings. It furnishes further evidence of how long medical science remained subject to magic and demonology.

After the beginning of the Christian Era, however, considerable progress was made in medical science. A physician named Charaka, supposed to have lived in the second century at the court of King Kanishka, produced a noteworthy book on medical practice. Eating, sleeping, and abstemiousness he declared to be the three supports of health. But his hygienic prescriptions were usually based upon moral and religious principles, and in this he showed himself inferior to the Greek Hippocrates

of Cos, who lived seven centuries before. Nevertheless, Indian medical practitioners made noteworthy progress in that they discovered the use of opium and quicksilver and used the pulse in diagnosing disease. They practiced dissection and employed the lancet in extracting arrows and cleansing wounds. Ointments were applied to sores, and emetics, purges, and enemas were administered. Although Indian medicine owed much to the Persians and to Greek inspiration, physicians like Charaka became widely known even in medieval Europe.

Astrology. Some progress was made in astronomy, for the Brahman rules for sacrifice depended upon an accurate knowledge of the length of the year, the phases of the moon, and the cause of day and night. But the search for real scientific knowledge was discouraged by the almost universal desire to make use of astrology. This pseudo science, introduced with the zodiac from the Tigris-Euphrates Valley, was employed on all occasions in public and private life to chart the course of human action.

Mathematics and Physics. It was in mathematics that the scholars of India made the most significant progress. Arithmetic was well developed—the use of the zero and the decimal system appear to be genuine Indian contributions. Algebra was developed to a high degree, evidently far beyond what it was among the Greeks. Simple equations, equations with more than one unknown, and equations of higher degree were understood. There also was progress in geometry and trigonometry. In physics the atomic theory and in logic the syllogism were more or less understood.

Mohammedanism Enters India. The rise of Mohammedanism, so important in the history of the peoples of Spain, Africa, Arabia, Syria, Asia Minor, Persia, and Central Asia, also influenced the culture of India. Arab power, firmly established in Persia, Baluchistan, and Afghanistan, filtered into the plains of Punjab and Sind. In 711, Mohammed ibn-Quassim, an Arab officer in Baluchistan, invaded Sind to avenge a piratical attack upon Arab traders of Basra, a port on the Persian Gulf. Sind, incorporated as a Mohammedan province, for a time marked the extent of Arab rule in India. Not until the rise of a Turkish power at Ghazni in Afghanistan was the victorious march of Islam resumed—when Mahmud of Ghazni, sultan from 989 to 1030, began a holy war against India.

"The whole country of India is full of gold and jewels, and of plants which grow there are those fit for making wearing apparel, and aromatic plants and the sugar cane; and the whole aspect of the country is pleasant and delightful. Now since the inhabitants are chiefly infidels and idolators, by the order of Allah and his prophet, it is right for us to conquer them." Impelled by this mixture of piety and profit, Mahmud

led a series of forays into northwestern India, that same region through which all great invasions of India had taken place since the days of the Rig-Veda. His incursions were accompanied with great slaughter, for his soldiers regarded the natives with utter detestation because they worshiped idols. One of Mahmud's exploits in 1024 was the capture of Somnath, a great Hindu temple-storehouse of fabulous treasure bequeathed to the gods by generations of pious worshipers. Many Hindus were slain—50,000, it is stated, were put to the sword—and colossal booty was carried to Ghazni.

The realm of Ghazni collapsed when a rival Afghan state with its capital in Ghur, about two hundred miles north of Ghazni, supplanted it in 1173. Its ruler Mohammed Ghuri (*d.* 1206) began the complete conquest of India in 1175 and by the close of the century had imposed Mohammedan rule upon the whole country including Bengal. The capital of this Mohammedan realm was established at the beautiful city of Delhi.

Mohammedan Influence on Indian Art. Being monotheistic, Mohammedans hated the polytheistic Hindus; and Mahmud of Ghazni earned the name of the "image breaker." The rulers of Ghur not only revealed a similar inflexible opposition to Hinduism but were equally opposed to the still flourishing Buddhism of the Mahayana type. The Buddhist school at Nalanda was destroyed, its library was burned, its relics and images were broken to pieces, and the monks were forced to flee to Tibet. This destructive policy marked the final extinction of Buddhism in northern India.

The invaders were not destroyers on principle, however. Their hatred was directed not toward art but toward sculptured figures of gods and goddesses, many of whom expressed erotic sentiments repulsive to puritanical Moslems. In their place, the Mohammedans constructed handsome mosques in the cities of northern India, in the general traditions of Arab art. Architects made use of the dome, pointed arch, slender tower, flat-surface carving, and intricate geometric ornament, which included verses taken from the Koran. Because they employed Indian masons and architects who did not hesitate to appropriate remains of Jain, Buddhist, and Brahman temples, there is a distinctive Indian flavor to the Moslem art of India.

The Taj Mahal. Although Moslem art flourished in India during medieval times, the most famous example of Mohammedan architecture in India dates from the seventeenth century. The Taj Mahal, begun in 1632 and finished in 1647, was constructed by the ruler Shah-Jahan (*d.* 1666) as a sumptuous resting place for the mortal remains of himself and his favorite wife. This structure, commanding the admiration of critics in many countries, has been pronounced the "miracle of miracles,

the final wonder of the world." The central chamber contains the tomb, over which rises a stately dome of rare beauty. On each side of the mausoleum is a splendid mosque. Four lofty minarets soar above this group of buildings placed at the end of a long terrace of formal gardens and pools of water that further enhance their beauty. The Taj Mahal, perhaps the highest artistic achievement of the Moslems in India, ranks with the supreme architectural creations of other civilizations as, for example, the temple at Karnak, the Parthenon, St. Sophia, and the Gothic churches of Christendom.

Spread of Mohammedanism. From India, Mohammedanism spread to eastern Asia, especially to the East Indies, although its earliest appearance there is shrouded in obscurity. According to tradition, the new faith was brought to Java and Sumatra about the year 1200. As the princes embraced Islam, their subjects followed their example. The new faith also was brought to the Philippine Islands, being introduced into Mindanao and Sulu in 1380. As in India and other countries, Moslem art followed in the wake of Islam.

Civilization of Medieval China. Medieval Chinese civilization attained an excellence that it probably has never surpassed in modern times. The Han rulers (206 B.C.–A.D. 221) gave to the Chinese state the form it was to retain with slight variation throughout medieval times. A number of dynasties succeeded each other after the Han Dynasty perished and many political difficulties arose during these centuries, but Chinese culture did not come to a standstill. With the rise of the Tang Dynasty (618–907) began an era sometimes referred to as the "second renaissance," the "first renaissance" having taken place under the Han Dynasty.

The Chinese Empire under the Tang Dynasty was more extensive than at any previous period, including as it did the lands drained by the Hwang Ho and the Yangtze and Si rivers and, in addition, a part of Sinkiang, or Chinese Turkestan. Its greatest extent from the northern outposts beyond the Chinese Wall to its southern limits was about 5,640 miles and from the borders of Tibet to the Pacific Ocean about 3,170 miles. China under the Tang rulers was the largest unified state in the world.

To govern a state of such proportions, many practical problems of administration had to be solved. The Tang empire was a centralized state with an organization much like that of modern European states before the advent of the steam engine. In all probability, no other state had ever existed that could compare with it in size and degree of administrative centralization. Its capital at Ch'ang-an on the Wei—a branch of the Hwango Ho administered an empire divided into ten provinces, each subdivided into prefectures.

The social organization of China under the Tang Dynasty had undergone significant changes since the early Chou, Ch'in, and Han dynasties. The powerful feudal princes who once owned broad estates and controlled the lives of many people no longer existed. Political authority was concentrated in the emperor; all state officials were required to carry out his commands to the letter. Below the "nobility of service," as they may be called, there was a numerous town population subsisting upon trade and industry. There also was a numerous peasantry living in the villages.

At the apex of the imperial organization stood the emperor, whose wish was final. He was assisted by a council composed of the chief court officials and ministers of the departments of the government. There were six such departments: civil service, which directed a vast body of administrative officials; revenue and finance, which assessed and collected taxes, took the census, regulated the land system from which a great share of the taxes came, and supervised transport of grain from the provinces to the capital; ministry of rites, which concerned itself with religion and public worship; defense, which supervised garrisons and maintained armies; punishments, which acted as a kind of judiciary; and public works, which supervised dikes, canals, bridges, roads, irrigation, and measures designed to prevent floods. The ministers sent commands to and received orders from officials in the prefectures. The latter stood in a similar relation to the officials of the subprefectures. These in turn possessed judicial and administrative authority over the villages and collected the public revenue. Such a governmental organization is best described as "bureaucratic."

To provide officials for so highly centralized an administration the Tang rulers revised the civil-service system. A successful examination became the passport to a good position. Candidates were questioned on the ancient Confucian classics. The imperial university at Ch'ang-an, which at one time had 8,000 students, provided instruction for all Chinese ambitious to enter governmental service. Although this system of examinations produced efficient officials, it possessed a serious defect. Based mainly upon the ancient Confucian classics, it created a conservative officialdom all too closely wedded to precedent.

In studying the character of any society the size of its population is an important consideration, and in the case of the Tang Dynasty the historian is fortunate in having reliable statistics. In 742, the capital Ch'ang-an covered an area 6 miles long and 5 miles wide and contained, suburbs included, 362,921 families with a total population of 1,960,188 persons. The city itself contained about a million inhabitants. The only city in Europe at this time that could rival it in size was Constantinople. According to the census reports of 754 the population of the

Chinese Empire was 52,880,488 persons and 9,069,154 families. There were 321 prefectures, 1,538 subprefectures, and 16,829 villages. No state in Europe could boast so numerous a population. Of the number of people living in India at this time we unfortunately have no information beyond the fact that that country, like China, was also densely populated.

The economic life of China under the Tang Dynasty made great progress. Commercial and industrial activity was so extensive that over a hundred mints were required to coin the money of the emperors. Taxes were sometimes paid in cash, more often in grain, silk, hemp, or cloth. By another form of taxation, citizens were required to give a number of days' labor on roads or other public works. Feeding the population of Ch'ang-an was a difficult task. Because the city was situated far from the grain-producing sections, large numbers of boats were required to convey the tax grain from all parts of the country through the Grand Canal and thence up the Hwang Ho. During the reign of Ming Huang (712–756) the annual grain consumption by the population rose to 160,714 tons. Further to care for the food supply of their populous capital, the Tang emperors developed an elaborate irrigation system in the region around Ch'ang-an.

The Tang Dynasty came to an end in 907 and, after an interval of anarchy, was succeeded by the Sung Dynasty (960–1279). This new dynasty organized a powerful state along the lines of the old empire and for a while was prosperous. Commerce throve, agriculture flourished, and population increased. In 1214, there were 20,882,258 families in China, representing a population of more than a hundred million inhabitants. But this prosperity was rudely shaken by the nomadic Mongols who lived in Manchuria and parts to the west. They seized northern China and in 1215 occupied Peiping (Peking), a serious blow to the Sung Dynasty.

Chinese Contributions to Civilization. That the Chinese, who lived in a society so highly organized, should make notable contributions to civilization is to be expected. Students of the history of European civilization are just becoming aware of the vast importance of Chinese history and the profound influence China exerted upon Korea, Japan, and northern and Central Asia. Distant lands in Europe also felt Chinese influences. Paper was made from silk, hemp, and the bark of trees as early as the year 100; samples of such paper were discovered recently in the Chinese Wall. By the year 300, paper was exported; fragments have been discovered by archaeologists digging in the faraway sands of Sinkiang. By 650, it was actively produced at Samarkand, where the Arabs learned the secrets of its manufacture and carried them to other parts of the Arab dominion. From there the art found its way into

Europe, where it replaced expensive parchment and proved a tremendous boon.

The Chinese also were responsible for the beginnings of mechanical printing, a process that made possible the cheap and rapid reproduction of books. Before the close of the Han Dynasty the Chinese had made

Fig. 57.—Chinese paper money, before 1400. (*Courtesy of The New York Times History of the Recorded Word Exhibition.*)

ink rubbings from the cut-stone texts of the Confucian classics. Ink had been invented even earlier, but an improved quality was developed when the Chinese began to employ lampblack. By the fifth century, it had become the practice to stamp characters in red ink upon paper by means of seals. There was much experimentation, especially in Buddhist monasteries, until genuine block printing appeared under the Tang Dynasty. A printed book, composed of a roll about sixteen

feet in length, was made in 868. Thenceforth, it became customary to print the classics in this fashion. Printed paper money and playing cards soon appeared. Printing reached its highest excellence under the Sung Dynasty and spread westward through the Arab countries until by 1400 block printing was practiced in Germany.

Construction of the Grand Canal—650 miles long from Tientsin to Hangchow—was an engineering feat second in importance only to the building of the Chinese Wall. The beginnings of the canal are older than the Chinese Wall, but most of it dates from the Sui Dynasty, which just preceded the Tang Dynasty. Wherever the land rose, the channel was dug deeper; wherever it was low, the channel was raised. Whenever it was necessary to cross low country, the water was confined within stupendous artificial banks faced with stones to prevent the waves of passing ships from tearing down the banks. Elms and willows were planted along the banks, partly to strengthen them and partly to add to the picturesqueness of the country. The Grand Canal greatly facilitated the transportation of tax grain to such populous imperial capitals as Ch'ang-an.

The use of tea as a beverage was a Chinese innovation dating from the fourth century. It became tremendously popular not only in China but in foreign countries as well. Porcelain—a fine, white, translucent earthenware manufactured from special clays—was produced probably as early as Han times. Pottery gained added beauty by the invention of fine glazes. The secrets of gunpowder were known during the Tang period; it was employed in fireworks, but its use as an instrument of war dates only from Sung times. Gunpowder was first employed in western Europe early in the fourteenth century, introduced from the East through Arabic channels of trade and travel. A most important Chinese invention was the compass, of immense practical value in navigation, and introduced to Europe during the thirteenth century. To make this remarkable list of contributions more complete, we must mention that the stirrup apparently was also invented during Tang times although the saddle had come into existence at an earlier date.

Oriental Trade Connections. Diffusion of Indian and Chinese cultural contributions was greatly aided by commerce. Only in recent years have historians become aware of the extent of economic relations between Europe and the Orient. This commercial development was most remarkable because the Tien Shan and Kunlun ranges, which separate China from Central Asia, and The Himalayas, which divide India from China, greatly impeded travel and commerce. Furthermore, the arid region of Central Asia was a serious obstacle to travel between East and West. But in spite of these barriers commerce steadily increased. A bronze vessel that dates back to the Han Dynasty has

been found in Rome amid debris of pre-Christian times. Silk was a prized luxury among the Romans. Pottery manufactured in China under the Sung Dynasty was widely exported; some of it has even been found in Zanzibar on the east coast of Africa. Spices were shipped by way of India from the East Indies as early as Roman times.

A constantly used trade route beginning with Ch'ang-an, the capital of the Tang empire, led up the Wei River and Hwang Ho valleys to the west. One branch of this route passed through Dungaria north of the Tien Shan Range. A second and a third branch led through Sinkiang, the former along the northern limits of this region, the latter along the southern border through Khotan and Yarkand. These branches came together at Kashgar; the first branch through Dungaria and Samarkand joined this route in Bactria and continued westward through Hamadan, Ctesiphon, and Zeugma to Antioch. At Kashgar, this route joined one that led across the Indus River at Peshawar and passed through the Ganges Valley to the Bay of Bengal. The eastern coastal cities of India were in constant commercial contact with Sumatra, Java, the Moluccas, and the Malay Peninsula. The western coastal cities enjoyed a flourishing trade with the ports of the Persian Gulf and the Red Sea. Trade routes along the eastern coast of China became increasingly important during Tang and Sung times. Thus was the Orient linked with the Mediterranean and northern Europe.

Foreign Religions in China. Many foreigners entered China. Figurines discovered in tombs dating from the Tang Dynasty show bearded Syrian merchants wearing pointed caps and carrying packs of merchandise. Others represent African negro boxers. Zoroastrian priests from Persia established their cult in China; but it is not clear whether or not many Chinese adopted this faith. Manichaeism also found its way there, and a number of monasteries were established. Attracted by prospects of trade, Jews appeared in China at an early date and settled in the towns on the coast. Mohammedanism likewise readily spread along the Asiatic trade routes; it appears that Arabs traded with China as early as the fifth century. Mohammedan missionaries who labored in China erected a mosque in Canton.

Finally, Christianity began to be felt during Tang times, not the orthodox form but the Nestorian. This originated with Nestorius, the Patriarch of Constantinople, who died about 451. He was much troubled about the question of the relationship of Jesus as man and Jesus as divine Saviour. He believed that the man Jesus had been born but emphatically denied that Jesus the Saviour had ever been born. In the person of Christ, therefore, Jesus was only a man in whom God himself dwelt. Furthermore, Mary was merely the mother of the human Jesus and not the mother of God. These views, echoes of the Nicene controversy,

spread eastward into India as well as China. A Nestorian priest from Syria named Olopun appeared at Ch'ang-an in 635 and was hospitably received by the Tang ruler. The books of the Bible were translated into Chinese. An imperial decree, issued in 638, commanded the opening of a Nestorian church in Ch'ang-an and ordained that it should be served by twenty-one priests. But Nestorian Christianity never became sufficiently strong to influence the Chinese, who steadfastly adhered to Confucianism, Taoism, Buddhism, and devotion to their ancestors.

POETRY UNDER THE TANG DYNASTY. The high development of Chinese civilization under the Tang Dynasty is clearly illustrated by the lyric poetry of the period. Deep love of nature breathes through many of the lines. *Midnight in the Garden* by Liu Chung-yuan equals some of the best poetry of the Romantic Age in nineteenth-century Europe:

The midnight hours were passing
  And sleep still past me flew;
My mind—so keenly working—
  Could hear the dropping dew.

So from my bed arising
  I open wide the door—
The western park revealing,
  And hills that heavenward soar.

Across the Eastern ranges
  The clear moon coldly shines
On bamboos, loosely scattered,
  And trailing mountain vines.

And so intense the stillness,
  That from the distant hills
I hear the pigeons cooing,
  And murmuring streams and rills.

For hours I have been thinking,
  As in a silent dream,
And now beyond the mountains
  I see the dawn's first gleam.

The following poem is one of the best by Tu Fu, a poet of the same period; it combines feeling for the beauty of nature with genuine pathos:

The setting sun beneath the red-lined clouds,
  Which mass around the foot-hills in the west,
Still floods the valley with a rose-hued light,
  And lures the chirping birds to seek their rest

The wayworn traveller pauses near the gate,
From which he sallied forth so long ago;
Unconscious then of what Fate held in store—
The years of separation, loss, and woe.

The neighbours press around the garden fence,
And gaze with mouth agape, or quietly sigh;
While wife and children, awestruck, rigid stand,
And then tears flow and to his arms they fly.

"For years on revolution's waves I've tossed,
While wife and bairns mourned me in hopeless plight;
And now to-night, as in a dream, I sit
With all my loved ones 'neath the lamp's bright light."[1]

PAINTING. The art of painting reached its highest excellence during the Tang and Sung dynasties. One important point to grasp in studying Chinese painting is the connection that existed between painting and handwriting. This was due in part to the invention of the hair brush used in making the ideographs employed in writing. Awkwardly drawn in the beginning, these gradually became beautifully symmetrical until painting and handwriting were regarded as sister arts. Chinese artists did not, like our artists, copy nature directly but took pains to study nature in every season, at every time of day, and in every condition of light and shade. They tried to understand the objects they were painting so that they could reproduce from memory their spirit and meaning as well as their forms. Thus, a master gave his pupil the following instructions:

Never paint even a stone without spirit; if you do, it will seem dead. Your painting must always show these things: the movement of the spirit through everything, the true form and color of each thing that you paint, and the relation of things to each other. If a great mountain is the most important part of your picture, that mountain must seem like a host and the other hills and the trees like his guests; or the mountain must be like a prince and the other parts of your picture his vassals. Look even at a flower; the blossom is a lovely lady and the leaves are her servants. So there must be a relation between all the parts of your picture.

SCULPTURE. Chinese sculpture never developed to full maturity. Only when foreign influences, particularly in connection with Buddhism, came into China were stone figures of merit produced. As has been pointed out, Buddhist sculpture in India originally developed under the spell of Greece. When the doctrines of the Buddha became influential in China, this partly Greek art accompanied them and merged with the native Chinese tradition. Excellent figures of the seated Buddha

[1] *Chinese Poems*, translated by C. Budd, pp. 132–133, Oxford University Press, London, 1912.

immersed in thought were produced. The Chinese custom of placing terra-cotta figures in their tombs offered another opportunity for sculpture. Because these were intended to serve the spirits of the departed, the artists prepared counterparts of the objects and comrades with whom the dead had been associated in life. This gave a naturalistic emphasis to Chinese art broader and more realistic than the strictly religious interpretation of the Buddhist craftsmen.

Architecture. Chinese architecture reflected the practical and religious habits of the people. To defend cities against the inroads of nomadic peoples, great walls with massive gates were constructed—a characteristic feature of Chinese architecture even today. The most striking feature of Chinese building arts is the pagoda. To these pic-

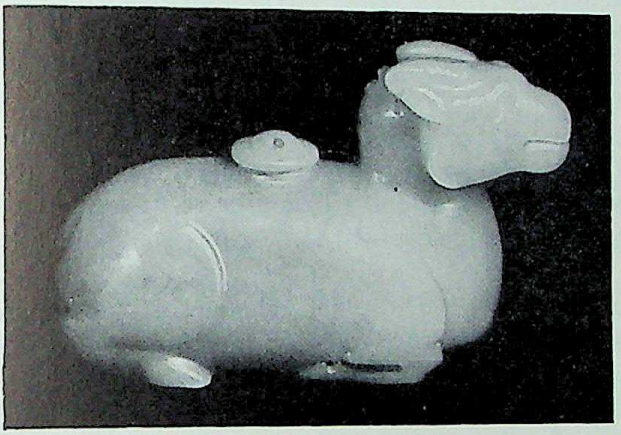


Fig. 58.—Quartzite camel, Sung Dynasty. (*Courtesy of the Seattle Art Museum.*)

turesque structures a number of origins have been assigned. Some students hold that pagodas are a development of the Buddhist stupa or Hindu gopura; others declare that they are a purely Chinese creation. Commemorative gates constitute another unique feature of Chinese architecture. Erected to perpetuate the memory of some public benefactor, they often have a central arch with one or two arches on each side. The commemorative arch at the entrance of the graves of the members of the Ming Dynasty, although modern, is an excellent example. One truly original feature of these structures is the massive roof with upturned edges.

Character of Chinese Culture. The development of science is not a conspicuous phenomenon of Chinese culture. The Chinese possessed a knowledge of mathematics sufficient for all practical purposes and made use of the zodiac and other astrological lore. But speculative science, which seeks to master the secrets of nature and thus to understand the universe, made little progress. There is at least one reason for this striking fact. The Chinese were first of all interested in practical

ethical relationships—hence the strongly moral character of Confucianism and the belief of the Taoists that nature should be allowed to take its course without human interference. They did not feel that what we in the Western world describe as science was necessary to right living and correct relationships in family, society, and state. This may explain why the Chinese during medieval times made striking progress in agriculture, architecture, painting, sculpture, poetry, statecraft, government, and technological inventions but made little progress in studying nature.

Civilization of Japan. Before bringing this sketch of oriental civilization during medieval times to a close, it remains to consider the culture of Japan. Like the Chinese, Indians, Sumerians, and Egyptians, the Japanese developed their culture from Paleolithic, Neolithic, Bronze, and Iron Age beginnings. The Japanese borrowed heavily from Korea, a political and cultural dependency of China ever since the period of the Han Dynasty. Chinese ideographic writing was introduced in the third century A.D.; but because the Japanese language was composed largely of polysyllabic words and possessed a more complex grammar, the Japanese added new characters. This process was stimulated when in 405 the Japanese sovereign brought to his court a Chinese scholar named Wani.

Japanese Religion. The chief religion of the Japanese people had been a simple worship of the deified forces of nature. They added to this the worship of men who had become gods, believing their sovereign as well as their ancestors were descended from the gods. Hence, they referred to Japan as the "land of the gods." Shinto, which means "the way of the gods," was a simple religion, having neither an elaborate creed nor an ethical doctrine. Sacrifices were offered, and devotion to ancestors was emphasized. Shinto shrines as a rule were simple in construction, and worship was accompanied by little ritual. The supplicant was required to approach the gods with a sincere heart after he had cleansed his mouth and hands.

Shinto inevitably became associated with patriotism. Mahayana Buddhism, brought into Japan from Korea in 538, also became popular, and Buddhist literature, sculpture, painting, architecture, and ritual were introduced. Many people who clung to the religion of Shinto as a patriotic duty and as an obligation to their ancestors accepted Buddhism as well. The influence of Buddhism had as great an effect upon the artistic development of the Japanese as it had upon the Chinese. The introduction of the Confucian classics and Confucian lore followed Wani's arrival at the Japanese court. Although as a religion Confucianism failed to supplant Shinto and Buddhism, it acquired much influence as a reservoir of ethical teaching.

TANG INFLUENCES. Chinese influences in Japan, already strong before the advent of the Tang Dynasty in 618, increased during the following centuries. The organization of the Japanese government had always been simple, for the sovereigns maintained a migratory court; the capital was wherever the sovereign happened to reside. Japanese rulers imitated the rulers of the Tang Dynasty. They laid out their cities with straight streets intersecting at right angles, built magnificent residences, and maintained elaborate courts. Their subjects imitated them, and gradually there came into existence a feudal land characterized by a society of many gradations. In this one respect, Japanese society was markedly different from that of China, a feature it retained until the 1860's.

While India, China, and Japan were developing their civilizations in the manner described, the peoples of western Europe—our medieval forefathers—were also making great advances. They made significant progress in religion and philosophical study and began to accumulate new knowledge about nature. This growing thirst for scientific inquiry—something very different from the thought of the peoples of the Far East—was destined to produce a profound chasm between the civilizations of the East and the West. To comprehend this fact, one must study the achievements of medieval civilization, which becomes our task in the following chapters.

FOR FURTHER READING

AYSCOUGH, FLORENCE: *Tu Fu, the Autobiography of a Chinese Poet*
BALL, J. D.: *Things Chinese*
CARTER, DAGNY: *China Magnificent*
CARTER, T. F.: *The Invention of Printing in China and Its Spread Westward*
COX, W. E., and Others: *The Romance of Chinese Art*
EDKINS, JOSEPH: *Chinese Buddhism*
FITZGERALD, C. P.: *China: A Short Cultural History*
FUNG, YU-LAN: "Why China Has No Science," *International Journal of Ethics*, Vol. XXXII, pp. 237–263, 1921–1922
GILES, H. A.: *The Travels of Fa-Hien*
GOWEN, H. H.: *A Study of Indian Literature*
———: *Outline History of China*
———: *Outline History of Japan*
GRANET, MARCEL: *Chinese Civilization*
———: *Festivals and Songs of Ancient China*
GROUSSET, RENÉ: *In the Footsteps of the Buddha*
HAVELL, E. B.: *Indian Architecture*
———: *Indian Sculpture and Painting*
HOPKINS, E. W.: *The Religions of India*
KEITH, A. B.: *A History of Sanskrit Literature*
LANE-POOLE, STANLEY: *Mediaeval India under Mohammedan Rule*
LEGGE, JAMES: *The Religions of China*

Chapter XXII

IMPACT OF THE EAST ON MEDIEVAL CULTURE: AGE OF THE CRUSADES

The European Middle Ages form a complex and varied as well as a very considerable period of human history. Within their thousand years of time they include a large variety of peoples, institutions, and types of cultures, illustrating many processes of historical development and containing the origins of many phases of modern civilization.—Charles H. Haskins

TURNING our attention to the cultural development of western Europe, we find ourselves in a favorable position to study the civilization of our medieval forefathers. We have formed some understanding of the civilization of Byzantium, which protected Christian Europe from the flood of Mohammedanism. We have traced the remarkable rise of Mohammedanism and the formation of Mohammedan society embracing peoples of many languages and cultural peculiarities living in Spain, Morocco, and other lands stretching eastward along northern Africa and through western Asia, Persia, and India, as far as Java. We have surveyed some of the achievements of the people of India and China and pointed out their cultural gifts to Europe. The history of Eastern influences upon western Europe forms a complex story. In this chapter, we wish to consider the more direct contacts between East and West: the Crusades, trade relationships, and the Mongol and Turkish invasions.

The Crusading Spirit and the Turkish Threat. That contacts between the Mohammedan East and Christian West increased constantly during the eleventh century is due, in part at least, to the Crusades. In fact, the zeal for pilgrimages became a dominant characteristic of the age. When the monks of Cluny erected a shrine in the choir of their monastic church, in full view of the worshipers, they stimulated a desire to pray at the tombs of martyrs. Many visitors came to Cluny, and enthusiasm for making pilgrimages spread far and wide. It was inevitable that to visit Palestine and worship amid the actual scenes of Christ's life soon became a passion, the dreamed desire of ardent Christians.

Such was the spirit of the West, such the European interest in the Near East, when the Seljukian Turks moved out of their haunts along the Aral Sea and the Jaxartes River. Like their distant relatives—the Huns, Avars, Kazars, Bulgars, Kumans, Patzinaks, and Magyars

MAP XXIII.—The Near East during the Crusades.

(Hungarians)—they rode their fleet ponies to the conquest and plunder of the Persian plateau. Next they occupied the fertile Tigris-Euphrates Valley and in 1055 captured Bagdad. Though brave and skillful fighters, they were nomads—products of a backward pastoral culture—with slight appreciation for the civilization of the Persians, Arabs, Jews, and Christians over whom they aspired to rule. Ever since Sumerian times the Tigris-Euphrates Valley had been a garden irrigated by canals and dikes. Now, lacking the technical knowledge to manage so complicated a system, the invaders allowed it to fall into disrepair, the land to go arid, and the regional prosperity to dry up like the ditches. At best, the Seljukian Turks appropriated some elements of the superior culture of their conquered subjects, but they contributed almost nothing to art, literature, science, commerce, industry, and government.

Soon the Seljukian Turks defeated the Byzantine Emperor Romanus at the battle of Manzikert in 1071. By 1075, Syria and Palestine had fallen into their hands, and Jerusalem with its holy places was in the possession of infidels. The Turks seized Asia Minor, subjecting it to a new state, the sultanate of Rum. Large numbers poured into the country, displacing the Greek-speaking population and uprooting Byzantine and Christian culture. Islam, personified by the old Bagdad caliphate, had long been in decline, exhibiting a tolerance toward subject Christians that sprang from growing political impotence. Suddenly Islam was regenerated by the fresh hordes of Seljukian Turks, who, recently converted to Mohammedanism, showed themselves determined enemies of the Christian faith. The death knell of Byzantium had sounded, and the emperor of Constantinople, Alexius I, frantically appealed to Pope Urban II for help.

This was a very auspicious moment, for the religious revival of the eleventh century to which the Cluniac congregation had contributed so much was still going forward with vigor. Convoking a council at Clermont in southern France in 1095, Urban II made a marvelously effective appeal to Christian feelings.

> O race of the Franks, O people who live beyond the mountains, O people loved and chosen of God, as is clear from your many deeds, distinguished over all other nations by the situation of your land, your catholic faith, and your regard for the holy church, we have a special message and exhortation for you. . . . The sad news has come from Jerusalem and Constantinople that . . . an accursed and foreign race. enemies of God, "a generation that set not their heart aright, and whose spirit was not steadfast with God," have invaded the lands of those Christians and devastated them with the sword, rapine, and fire.

The following account was calculated to move the rough and pious feudality:

Some of the Christians they have carried away as slaves, others they have put to death. The churches they have either destroyed or turned into mosques. They desecrate and overthrow the altars. They circumcise the Christians and pour the blood from the circumcision on the altars or in the baptismal fonts. Some they kill in a horrible way by cutting open the abdomen, taking out a part of the entrails by tying them to a stake; they beat them, and compel them to walk until all their entrails are drawn out and they fall to the ground. Some they use as targets for their arrows. They compel some to stretch out their necks and then they try to see whether they can cut off their heads with one stroke of the sword. It is better to say nothing of their horrible treatment of the women.

Having aroused his hearers by this "atrocity story," Urban next appealed to their religious and patriotic prejudices.

Whose duty is it to avenge this and recover that land, if not yours? For to you more than to other nations the Lord has given the military spirit, courage, agile bodies, and the bravery to strike down those who resist you. Let your minds be stirred to bravery by the deeds of your forefathers and by the might and greatness of Charlemagne and of Louis his son and of the other kings who have destroyed Turkish kingdoms and established Christianity in their lands. You should be moved specially by the holy grave of our Lord and Saviour which is now held by unclean peoples, and by the holy places which are treated with dishonor and irreverently befouled with their uncleanness.[1]

An attempt to redeem the Holy Sepulcher would be meritorious in the sight of God, and profitable as well.

O bravest of knights, descendants of unconquered ancestors, do not be weaker than they, but remember their courage. If you are kept back by your love for your children, relatives, and wives, remember what the Lord says in the gospel: "He that loveth father or mother more than me is not worthy of me." . . . Let no possessions keep you back, no solicitude for your property. Your land is shut in on all sides by the sea and mountains and is too thickly populated. There is not much wealth here and the soil scarcely yields enough to support you. On this account you kill and devour each other. Let your hatred and quarrels cease, your civil wars come to an end, and all your dissensions stop. Set out on the road to the Holy Sepulcher, take the land from the wicked people, and make it your own. That land which, as the Scripture says, is flowing with milk and honey, God gave to the children of Israel. Jerusalem is the best of all lands, more fruitful than all others, as it were a second Paradise of delights. This land our Saviour made illustrious by his birth, beautiful with his life, and sacred with his suffering; he redeemed it with his death and glorified it with his tomb. . . . Set out on this journey and you will obtain the remission of your sins and be sure of the incorruptible glory of the kingdom of heaven.[1]

[1] THATCHER, O. J., and E. H. MCNEAL, *A Source Book for Mediaeval History*, pp. 518–521, Charles Scribner's Sons, New York, 1905.

The speech of Urban II produced a wave of enthusiasm. "God wills it," shouted the multitude. Many pressed forward to take the cross, that is, made a promise to go on crusade. They carried back to their homes a fiery zeal to redeem the Holy Sepulcher. The First Crusade (1096–1099) was the most successful, for it wrested Palestine from the infidel and established four Christian states: the kingdom of Jerusalem, the principality of Antioch, and the counties of Edessa and Tripoli. Adventurous nobles of France, England, and other lands journeyed to Palestine to reinforce their relatives and friends. Some went intending never to return. Since ancestral estates in Europe were inherited by eldest sons according to the law of primogeniture, younger sons were eager to go, for they hoped to find new opportunities in Palestine, which had been described by Moses as the land flowing with milk and honey.

In spite of the steady stream of crusaders and adventurers, the Christians already established there could hardly hold their own against the infidels, who seized Edessa in 1144. This at once roused Christian Europe to make renewed efforts to conquer the holy places. King Conrad III of Germany and King Louis VII of France collected armies for the Second Crusade (1147–1149), which were so mismanaged that nothing was accomplished. Hence, the pressure was not relieved; finally, the capable and cultivated Saladin seized the capital, Jerusalem, and Acre, the chief military outpost of the kingdom of Jerusalem. Again a cry of protest rose in Christian lands, and Emperor Frederick Barbarossa of Germany, King Philip Augustus of France, and King Richard I of England set out with armies to redeem Palestine. But these kings were so jealous of each other that the Third Crusade (1189–1192) also failed to accomplish anything.

Society of the Crusaders. The crusader states of Palestine were organized on the pattern of the feudal states of western Europe. At the head of the state stood the feudal prince; below him were vassals and subvassals. The country was divided into manorial estates tilled by the native population, who became serfs. The lords held court for this manorial population and were themselves subject to the feudal courts of the prince. Christian and Mohammedan, therefore, lived together and gradually learned to respect each other. Old fanatical hatreds that the newcomers at first showed toward the Mohammedans began to disappear as they became aware of the Saracen's virtues and cultural superiority. Gradually, the Christian lords and traders became wealthy and tolerant; even in the first generation they began to adopt the finer manners and customs of the East. Luxurious habits and refined tastes soon developed; bathing and the practice of shaving the beard became common. Europeans learned to use new fruits and vegetables and imparted new ideas

to friends and relatives in the West. In this way the Crusades facilitated the diffusion of Arab culture among Western lands.

Exaggerated Importance of the Crusades. Until about the middle of the nineteenth century, students knew little about the Middle Ages. Many thought that this period was an arid waste in the history of civilization, that nothing of importance took place save the Crusades, and that advances in medieval culture were due entirely to them. Romantic writers never wearied of stressing the importance of the Crusades. Sir Walter Scott (*d.* 1832), for example, penned such novels as *Ivanhoe* and *The Talisman*, fascinated by the action, color, episodes, and personalities of those stirring and romantic movements. It was believed that the Crusades put an end to the "unprogressive" society of the Middle Ages and produced a revival of trade and industry, with the resulting growth of towns and population. It was believed also that the rough crusaders learned much about the more civilized manners and thought of Arabs, Persians, Jews, and Byzantine Greeks. This was regarded as the beginning of whatever learning, science, and elegance Western Christian lands possessed during the Middle Ages. The Crusades, therefore, were considered the main creative phenomenon of the Middle Ages, a turning point in the history of civilization.

This is an exaggerated view, but some writers still stress such ideas. In Chap. XXIV we shall learn something of the revival of trade and industry in Christian Europe before the First Crusade. In regard to medieval culture the following chapters are so arranged as to illustrate its natural unfolding. We shall see that the medieval renaissance of the twelfth century was indeed due partly to the infiltration of Greek and Arabic science and learning. This culture spread gradually into Christian lands from many quarters—Toledo, Cordova, Palermo, Naples, Venice, Alexandria, and Constantinople. The process had begun before the First Crusade (1096–1099). Most certainly it would have continued and at an increasing rate even if the Crusades had not been organized. Hence, the "reawakening" of Christian Europe, as so many writers have described it, was not caused primarily by the Crusades.

Genghis Khan. The government of the Seljukian Turks in the Fertile Crescent did not last long. Incompetence and anarchy set in. As happened so often with nomadic peoples, the Seljukian Turks were followed by another kindred people—the Mongols, or Tartars, who emerged from the steppe regions and moved into the fertile land of Persia, India, and the Tigris-Euphrates Valley. Originally they occupied the region around the Altai Mountains and the Tien Shan Range. Their realm comprised the grassy steppes that lay between the timber regions north of the Amur River and the Hwang Ho to the south, part

of which is still known as Mongolia. During the third century B.C. the Mongols made forays into northern China, and the Chinese emperors constructed the Chinese Wall as protection against them. Even though the Mongols lived for centuries on the confines of China, they remained nomadic. Their own culture changed little although they borrowed a few elements from the superior Chinese civilization to the south.

Finally, the Mongol tribes were united by the political genius of Genghis Khan,[1] whose reign began in 1206. From his capital at Caracorum in Mongolia he began a remarkable series of conquests. It would perhaps be impossible to find in all history a people more cruel in the treatment of conquered populations. They harried the country through which they passed, plundered, and burned towns. The population of Bokhara, Merv, Nishapur, and other places were nearly exterminated. Of the 100,000 said to be living in Herat, it was stated that only 16 escaped the sword.

The work of Genghis Khan (*d.* 1227) was continued by his successors. From Caracorum the Mongols plundered China as far as the Yangtze River, India, western Asia, and Russia. Batu swept through eastern Europe, committing frightful excesses and defeating the Poles and Hungarians. His westward march stopped at Liegnitz; there in 1241 he defeated the Slavic chivalry but fortunately did not pursue his advantage. He retired to southeastern Russia, where he established the realm of the Golden Horde with its capital on the Volga River. His authority extended northward in Russia as far as Novgorod, with the Russian princes as vassals. The fright inspired by the ferocity of the Tartars, as the Mongols were called in Europe, may be traced in the writings of chroniclers. As in the case of other nomads, the Tartars successfully established themselves on the treeless steppes but could not permanently subdue the agricultural lands inhabited by a numerous peasantry and protected by a powerful chivalry. The realm of the Mongols soon reached its greatest extent, stretching from Novgorod and the Tigris-Euphrates Valley eastward as far as the Amur and Yangtze rivers.

Subjection to the Mongols proved a curse to Russia; development of Russian culture was definitely checked. The vast territory between

[1] The expression "Genghis Khan" means "chief khan." Historians have curiously given this name only to Temudschin, discussed above. The following gives Genghis Khan and his successors, with the dates (when known) of their rule or death.

Temudschin (Genghis Khan, 1206–1227)

Tulni			Djuji	Ogotai (1229–1241)
Hulagu (*d.* 1265)	Mangu (1251–1259)	Kublai (1259–1294)	Batu (*d.* 1255)	Kujuk (1242–1247)

the Baltic Sea and the Gulf of Finland in the north and the Black Sea in the south remained economically stagnant. Towns like Kiev and Novgorod languished. The principality of Moscow became a servile and unprogressive dependency of the Golden Horde. Town life failed to develop; Russia remained a land of peasants and nobles. Not until 1480 was Tartar overlordship destroyed. The principality of Moscow then emerged, the nucleus around which the Russian state was to form.

TAMERLANE. The Mongol state was governed by a chief khan, a number of viceroys, or subordinate khans, ruling the provinces. One of these khans was Tamerlane (*d.* 1405), an able and ambitious descendant of Genghis Khan. Tamerlane began his career as an independent ruler by seizing Turkestan and Khurasan. No other figure has won such notoriety for his cruelty. He seized Persia and, it is stated, caused 70,000 prisoners to be executed and their heads piled up to form towers. After occupying the Tigris-Euphrates Valley and Armenia, he invaded India, slaughtered countless numbers of captives, and plundered the city of Delhi. Fierce and without pity, he conducted thirty-five expeditions, in each of which the ravages were dreadful.

Tamerlane also attacked the Ottoman Turks in Asia Minor. Closely related to the Seljukian Turks, they had settled in Asia Minor as a vassal people of the Seljukian sultan of Rum. The Ottomans had profited from the decline of their Seljukian masters and also from the growing feebleness of the Byzantine Empire. They attacked the territory still belonging to the Byzantine Empire in Asia, seized it by 1338, crossed over the Dardanelles in 1353, and began to subdue the Balkan Peninsula. Tamerlane crushed their ambitious army in the Battle of Angora (1402). But, with all his successful conquests, he was not a constructive ruler and failed to found a lasting state.

MONGOL CULTURE. The Mongols, or Tartars, were a greater scourge than the Huns or other nomads. But, in spite of their destructiveness, some of them possessed a surprising capacity for absorbing the civilization of the Far East. In 1215 the Mongols established themselves at Cambulac, the modern Peiping. Kublai Khan ruled there from 1259 to 1294, finally extending his authority over Tibet and southern China. It is remarkable that the Mongols in China completely abandoned their destructive habits. Kublai Khan built a palace at Cambulac, and this became the center of a magnificent court life characterized by much ceremony and lavish banqueting. Trade and industry flourished, and the city of Peiping grew up beside the khan's palace. The Mongols became Chinese, appropriating Chinese culture just as the nomadic Magyars on the plains of Hungary had adopted Western civilization. In much the same fashion the Mongols living in Turkestan and in the lands south of the Aral Sea took over some elements of the superior

culture of the Persians. Though formerly plundered and decimated by the Mongols, Samarkand and Kashgar once more became opulent cities.

The Mongols and Christianity. Europe was frightened by the rumor of Mongol raids. "A fierce race of inhuman beings whose law is lawlessness, whose wrath is fury, the rod of God's anger, is passing through and dreadfully ravaging a wide tract of country, horribly exterminating with fire and sword everything that comes their way," it was stated. Pope Innocent IV, elected in 1243 when the Mongol menace was greatest, conceived the idea of converting the Mongols to Christianity. During the Tang Dynasty, as we have learned, Christian influences had entered China gradually by way of the trade routes over the steppes and desert lands of Central Asia. From the regions of Asia came rumor of a Christian prince named Prester John. Western imagination, stimulated by the fact that the East was the source of costly gems, cloths, spices, and other luxuries, never tired of embroidering this tale of Prester John. Some thought that he was a great khan; others believed that his realm was Abyssinia.

Pope Innocent IV hoped that the conversion of the Mongols was possible in view of the tales of Prester John and the rumor that Batu Khan was eager to embrace Christianity; they might even help against the Mohammedans who were holding Palestine. He therefore dispatched a Franciscan friar named Giovanni Piano Carpini (*d.* 1252) to visit Batu at his capital on the Volga. There were some Christians among the khan's family and his entourage, but the khan had little intention of embracing Christianity. To the Pope's entreaty he replied, "God has commanded my ancestors and myself to send our people to exterminate wicked nations. You ask me if I am a Christian; God knows, and if the Pope also wishes to know he had better come and see."

In spite of this rebuff, Louis IX, or St. Louis as he is popularly known, who ruled France from 1226 to 1270, tried to negotiate with the Mongols. He sent two Dominican friars, who traveled for a whole year before they reached the khan's court. "They found all the land subject to the Tartars (or Mongols) and many cities they had destroyed, and great heaps of dead men's bones," states the chronicler Joinville. The reply to King Louis's entreaties was pithy and in the Mongol manner. "We admonish you to send us, year by year, of your gold and silver, and thus keep us to be your friend; and if you will not do this, we will destroy you and your people, as we have done to the kings already named." But King Louis heard from the Dominicans of another Mongol Khan who had become a Christian. Therefore, he hopefully sent a Franciscan, Guillaume de Rubruquis (*d.* 1293), who finally arrived at the court of Mangu Khan and accompanied the court to Caracorum, where he found

living a French goldsmith named Guillaume and an Englishman named Basil. But De Rubruquis could accomplish nothing in spite of the fact that the khan's wife was a Christian.

Another Franciscan, Giovanni de Montecorvino, was sent by Pope Nicholas IV in 1275 to bring the Mongols of Persia to the faith. On his return in 1289, he recommended that the Mongol world should be converted to Christianity as soon as possible. Duly appointed to begin the task and provided with the necessary papal letters, he set out for Cambulac. Instead of traveling over the steppes by way of Caracorum, he went by ship from the Persian Gulf to India and thence by Ceylon, Malacca, and the China Sea to northern China, reaching Cambulac in 1294 shortly after the death of Kublai Khan.

The result of these missionary activities was remarkable. The first Catholic church was built in Cambulac in 1300. Chinese boys were taught the Latin ritual and trained in Western music. A second church was erected next to the khan's palace. "The lord Khan can hear our voices in his chamber; and this wonderful fact is published far and wide among the heathen and will have great effect, as divine mercy shall dispose and fill," wrote a missionary in 1306. The New Testament and the Psalter were translated into the Mongol language, and pictures illustrating Christian teaching were used in worship. Finally, in 1307, Pope Clement V erected a new archiepiscopal see at Cambulac to include all Asia east of Persia. He named seven suffragan bishops; and one episcopal see at Zaiton was actually established. Giovanni of Montecorvino, the first archbishop of Cambulac, died in 1328, but the church flourished until a hostile reaction set in about the middle of the fourteenth century that destroyed the growing organization.

Marco Polo. Profoundly affected by the superior culture of the Chinese among whom they lived, the Mongols looked with favor upon merchants, artists, and writers. Traders traversed the vast spaces between the Dnieper and Volga and the Mongol court at Cambulac. Chief among these merchants were two Venetian jewelers, the brothers Niccolò and Maffeo Polo. They had a business house in Soldaia, a city in the Crimea, the chief base of Italian merchants trading with Mongol lands. The business of the Polo brothers led them to the Mongol capital on the Volga, Bokhara, and Cambulac, where they met Kublai Khan. Interested in his European visitors, the khan resolved to send them back to Europe as envoys to the Pope. In the letters they carried the khan asked for a hundred men who could explain the Christian faith and the seven liberal arts to him and his subjects. Finding that Pope Clement had died and that a new papal election would not take place soon, the merchant envoys decided to return at once to Cambulac. Taking Niccolò's son Marco, a youth of but seventeen years, with them, they

traveled by way of Acre, Tabriz, Khuorasan, The Pamirs, Kashgar, Yarkand, Caracorum, and The Gobi. Finally, in 1275, they arrived at the palace of Kublai Khan. The three Polos returned to Venice in 1295 after having seen many strange lands and peoples and becoming acquainted with many foreign ideas and customs.

THE BOOK OF SER MARCO POLO. Marco Polo was taken prisoner by the Genoese in one of their bitter wars with the Venetians. But posterity was enriched by this misfortune, for while in prison Marco amused himself by writing an account of his travels. *The Book of Ser Marco Polo* is one of the world's most interesting travel books; few tales have proved so entertaining and instructive. It describes The Pamirs, the regions around Kashgar and Yarkand, and the route to Caracorum, which remained unvisited by Europeans until 1838 and 1860. Many chapters are devoted to the interesting court life at Cambulac.

Mongol rulers favored commerce between the European West and the Asiatic East. Caravans increased in number and size. Their routes extended westward from China to Bokhara, from which they passed either through Astrakhan to Crimea or through Tabriz and Asia Minor to Acre. Even the destructive Turks did not seriously interfere with commerce in silks from China and spices from the East Indies. There is little truth in the oft-repeated story that the Turks, by cutting off this trade in prized articles of luxury, forced Europeans to try to attain them by sailing westward around the world. The Turks exerted no appreciable influence upon the voyages of discovery that began with the epochal expedition of Christopher Columbus in 1492.

DECLINE OF BYZANTIUM. The Byzantine Empire declined after the thirteenth century. The Crusades at first relieved some of the pressure of the Seljukian Turks, but the results of the Fourth Crusade (1202–1204) dealt the empire a blow from which it never recovered. The crusade was intended initially to redeem the Holy Land; soldiers gathered in Venice to take ship, but falling into debt they were diverted from their purpose. To extricate themselves from their difficulties, they agreed to help the Venetians, who were more eager to extend their commercial interests than to drive back the Mohammedans. The crusaders seized Constantinople and plundered it mercilessly. But, once established in the city, the Venetians quarreled with the Genoese. The empire suffered from all this fighting, lost its commerce and wealth, steadily became weaker, and soon was unable to resist the Ottoman Turks. Finally, in 1453, Constantinople fell.

Founded by Constantine in 330, this great city had ruled over a state that perpetuated to the very threshold of modern times something of ancient Greek and Roman culture. Its civilizing mission now seemed ended. Western Europe by 1453 had made great advances in culture;

it no longer needed Byzantium's tutorship. Nevertheless, it caused a shock in Europe when the Ottoman Empire extended its boundaries to the Danube. Henceforth, Europeans were forced to defend themselves at this point. Had they shown some political farsightedness at the time of the Fourth Crusade and strengthened rather than weakened the Byzantine Empire, they might have turned back the Turk at the Dardanelles.

Fate of Arabic Culture. How did Arabic culture fare at the hands of the Turks and other mongoloid nomads? Arabic culture was a continuation of Greco-Roman culture, modified by important original contributions. Before the year 1000, the Arabic lands led Christian Europe in civilization. This leadership was nearly ruined by the invasions of the nomads. Hence, after 1200 we note a decline in the civilization of Persia, Mesopotamia, and Syria. For a time, however, so long as the trade routes between the Asiatic East and the Christian West passed through these regions, there was some semblance of prosperity. The Arabs retained a monopoly of trade in silk, spices, and articles of luxury. But this, too, came to an end. Vasco da Gama, a Portugese navigator, in 1498 established a commercial route by water from Lisbon to Calicut in India by way of the Cape of Good Hope. This event caused a cultural revolution in which the leadership of the Semitic peoples, particularly the Arabs, passed to the peoples of western Europe.

Summary of the Role of the Nomads to 1526. By the close of the Middle Ages the fateful role of the Asiatic nomad came to an end. The time when he could emerge from the steppes and plunder fertile agricultural lands to the south and murder their inhabitants was past. Christian Europe could not be conquered by the Turks and Mongols. Its relatively numerous population, rural as well as urban, its superior military knowledge, and its advanced agricultural, commercial, and industrial culture checked the Turkish advance. The Turks indeed conquered most of Hungary when they defeated the poorly organized Hungarian chivalry in the Battle of Mohács in 1526. But the Turks made few additional conquests and soon were forced to retreat. They lost the battle of Lepanto in 1571 in which the Christian fleet of King Philip II (*d.* 1598) of Spain defeated the Turkish navy and restricted future Turkish naval activities to the eastern Mediterranean. A century later, in 1683, the Turks were driven from the gates of Vienna by John III, King of Poland. These defeats removed the last threat of a Turkish conquest of Europe. The rise of Russia under Ivan III, Grand Prince of Muscovy from 1462 to 1505, and Czar Peter I, who ruled from 1689 to 1725, also helped to put an end to nomadic threats in the north. Now secure against the destructive forays of Asiatic nomads, western Christian

Europe was free to develop the characteristic civilization that we shall study in the following chapters.

FOR FURTHER READING

ARCHER, T. A., and C. L. KINGSFORD: *The Crusades*
BARKER, ERNEST: *The Crusades*
BYRNE, DON: *Messer Marco Polo*
CARTER, T. F.: *The Invention of Printing in China and Its Spread Westward*
CHEYNEY, E. P.: *The Dawn of a New Era*, 1250–1453
CZAPLICKA, M. A.: *Aboriginal Siberia*
———: *The Turks of Central Asia*
DAVIS, W. S.: *A Short History of the Near East*
GIBBON, EDWARD: *Decline and Fall of the Roman Empire*
HUDSON, G. F.: *Europe and China*
KREY, A. C. (ed.): *The First Crusade*
LAMB, HAROLD: *The Crusades*
MUNRO, D. C.: *The Kingdom of the Crusaders*
NEWHALL, R. A.: *The Crusades*
NEWTON, A. P. (ed.): *Travel and Travellers of the Middle Ages*
PEARS, EDWIN: *The Fall of Constantinople*
POWER, EILEEN: *Mediaeval People*
SEEGER, ELIZABETH: *The Pageant of Chinese History*
SYKES, PERCY: *A History of Exploration*
———: *The Quest for Cathay*
YULE, HENRY (ed.): *The Book of Ser Marco Polo the Venetian*

Chapter XXIII

PEASANT AND NOBLE: MANOR AND CASTLE

In the sweat of thy face shalt thou eat bread. . . . —Genesis 3:19

IN STUDYING the more brilliant achievements of civilization, we often forget the common man, whose daily toil provided the economic and social bases of life. We think only of the deeds of great men and ignore traders, peasants, and craftsmen because we imagine they produced nothing important. This view has been popular with historians, but it is incorrect. In modern times, with the advent of democracy, which upholds the right of the common man to have a voice in determining how his affairs are to be managed, scholars have paid more attention to the plain man. Without the workingman's toil the entire fabric of society as well as its culture would collapse. Historians who have emphasized the deeds of great men have been justly criticized for the "great-man" theory of history. Great men there have been, and many; but we must not ignore the common man.

Importance of the Peasant. The peasants of Europe constituted the vast bulk of medieval society. In the days of Charlemagne (*d.* 814), they formed at least 90 per cent of the population. It is difficult for us living under the modern conditions of big industry and rapid communication to comprehend the significance of this fact. In the United States today, less than one-half the people gain their living from the soil; in Belgium, the proportion is even smaller. The pictures formed by reading romances dealing with medieval Europe give us the wrong impression that most of the people were nobles. It may be assumed that 90 per cent were peasants. Of the remaining 10 per cent, probably half were noble, the rest clerical. This proportion is sufficiently accurate to give a working idea of the size of these groups.

Agriculture was the foundation on which medieval society principally rested. This fact is often misunderstood, because writers never weary of saying that the Middle Ages, being chiefly agricultural, were "backward and static." Such statements are unfortunate, for they give those who are beginning the study of history erroneous ideas difficult to eradicate. The truth is that there need be nothing "backward and static" about a society because it is essentially agricultural. Medieval agricultural society, when properly understood, represents an advanced form of such an economy.

Agricultural life already had an ancient history when the Middle Ages began. It had enabled man to abandon the hunting habits by which he obtained his food during countless generations in the Paleolithic Age. He began to cultivate wheat, rye, and vegetables, thus guaranteeing himself a constant supply of food. Finally, because crops were sown, men ceased to wander in search of food and stayed at home to watch the growing supply. Village life became common. These basic changes of the Neolithic Age were gradually improved upon so that large-scale agriculture became common in Egypt and Mesopotamia at the dawn of history. From that time until our own day, agriculture has remained the chief means of obtaining food. There have been many improvements in methods, but its fundamental character has changed little.

THE MANOR. The manor, a typical unit of medieval agrarian life, permitted agricultural production on a scale larger than had been customary in the Bronze Age and in Celtic, Germanic, and Slavic Europe long after the barbarian invasions had ceased. It produced a system whereby a small class of lords regulated a large number of peasants. The origins of this system of large estates are found far back in history. As early as the fourth millennium B.C., Egypt was divided into estates, belonging to nobles, temples, and the Pharaoh, who was the greatest landlord in Egypt. There were also great estates in the Tigris-Euphrates Valley. Later, in Hellenistic times, the large estate became a regular feature of Greek rural life. When the Emperor Augustus seized Egypt, he acquired the estates that had belonged to the Pharaoh and became the mightiest landlord in the Roman world. During the closing centuries of the Roman Empire the large estate—*fundus* or *villa*—became a regular feature of agricultural life, the forerunner of the medieval manor. But in accepting this statement a word of caution is necessary. Not all features of the medieval manor came from the Roman estate; some of them were the product of circumstances peculiar to medieval society.

Each manor had a village; its houses stood close together, often wall to wall, presenting a compact appearance. Only in Germanic and Slavic regions were the houses surrounded by garden plots, thus presenting a scattered appearance. The village, usually situated on a stream, was the center of manorial life. Here stood the lord's house or that of his bailiff. Near by were the smithy, stables, granaries, barns, and threshing floors. Here also was the wine press if the manor was situated in southern Europe or the cider press if in northern France. The village church with its adjoining churchyard stood near by, together with the parish house, abode of the priest. The rest of the houses belonged to the peasants.

The fields belonging to the manor lay outside the village. There was the greatest variety in the arrangement of fields. These were divided

into strips that in England were usually 40 rods long and 4 wide; but the strips were often irregular in shape, and dimensions varied considerably. No fences separated the strips. Only a turned-up strip of sod marked the boundary between individual holdings. These strips

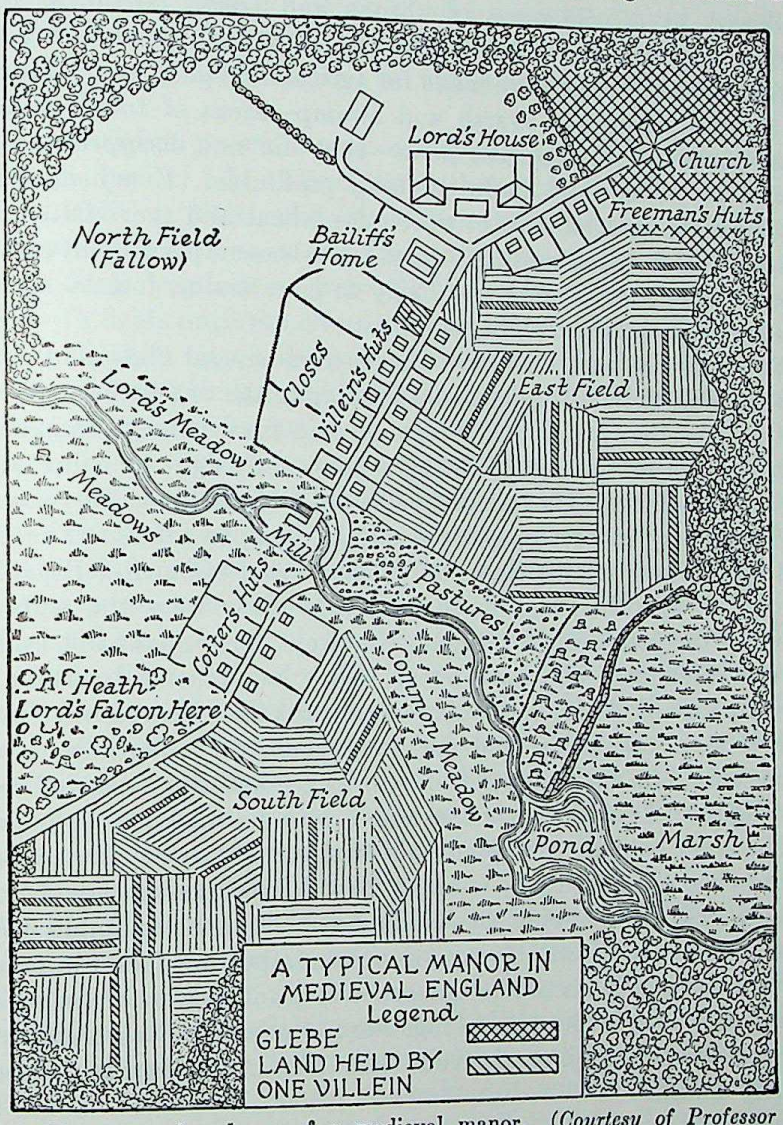


FIG. 59.—Diagrammatic scheme of a medieval manor. (*Courtesy of Professor S. K. Everhart.*)

of sod were called "balks"; the end of the strip was called "headland." The fields, each containing strips, varied in number, three or four being the least, depending upon whether the manor followed the two-field or the three-field system of cultivation. Often there was a large number of fields whose irregular shapes gave the manorial estate the appearance

of a crazy quilt. Because they were not surrounded by fences, they were called "open" fields.

Extensive forests covered the medieval landscape. During the decline of the Roman Empire, large stretches of farm land had been abandoned to a wilderness of shrubs and trees. Medieval manors therefore had an abundance of forest, although its area constantly diminished as clearings were made for agricultural purposes. There was also a large amount of marsh and swamp—areas of tough grass and useless shrubs amid stagnant pools—that did not disappear until the pressure of population made draining profitable. Every manor was likely to have land too wet in winter for wheat and rye. Often it was too wet even for spring seeding. Such lands became permanent meadows. Consequently, every manor was likely to have arable, forest-, meadow-, and some wasteland within its confines.

Workers on the Manor. There were several classes of workers on the manor, to be distinguished according to the duties they performed and the dues they paid. (1) Freeman paid fixed money rents, worked for the lord in harvest and plowing season, and might be called to help protect the manor. They were free to sell their holding, move, or send their sons away to become priests, monks, or apprentices. The proper name for workers of this class is "villeins," that is, men of the *villa*, or manor. (2) Another and more numerous class were the serfs, who resembled the colons of the Roman Empire. They might not leave the land on which they had been born. They had inherited certain dues, which the lord of the manor could increase at will. These dues consisted in services on the lord's land and in payment of a percentage of the produce raised on their own fields. (3) There was also a class of cotters, or cottagers. A cotter owned a house with a small patch of ground scarcely large enough to support his family. He owed services to the lord and eked out a living by working for villeins or serfs as best he could. (4) There were also slaves in the Middle Ages. But their number declined so that in medieval times slavery was not an important factor in manorial life. Slaves usually served as domestics and not as workers in the field. We may group these four classes together as "peasants," a word borrowed from the French *paysan* derived from the Latin *pagensis*, meaning "country dweller."

On what terms did peasants till their strips? The manorial arable was divided into two parts, one tilled by the peasants for the lord's profit, the other by the peasants for their own. The lord's part consisted of a number of strips in each of the fields, the rest of the strips belonging to the peasants. A peasant's holding consisted in a number of strips, together with house and other buildings and some rights to the common meadow and pasture on the wasteland or in the woods. From the

meadow the peasant received a portion of hay, which helped him keep his cattle through the winter; on the waste and in the woods, he might pasture pigs and cows; from the woods, he might also gather fagots for his hearth. These rights passed from father to son for generations. A few years ago a French newspaper held a contest among peasants to discover the most ancient titles. One peasant was able to produce documentary proof that the land he was tilling had been in his family since 900.

For such rights, peasants owed customary rents to the lord, payable in grain, poultry, or pigs at fixed times, that is, at Easter or on a saint's day. In addition, they owed labor dues called *corvées*. Villeins owed a few days' labor each week and some extra days in times of sowing and harvest. Serfs were not so well off; they might be required to serve in the lord's fields until the crops were harvested, after which they were free to tend their own. Peasants, especially serfs, were also required to build roads and bridges, dig ditches, and help in constructing castles and keeping up fortifications.

Special sums, which were often burdensome, were demanded of peasants. The lord might assess an annual head tax. He took part or all of the chattels and goods of the peasant upon death, leaving to his heirs only the hereditary holding. When a peasant's son left the manor to become a priest, his father had to pay a sum of money. When his daughter married a serf of another manor, a sum was exacted. In addition, there was tallage—a special tax assessed according to need and particularly hard to bear because unforeseen. The lord, as a rule, had the only mill, bake oven, and wine press on the manor, and the peasants were required to use them, paying for the privilege by giving a portion of their flour, bread, and wine. For infractions of the customary rules of the manor, peasants were tried in the manorial court. Money from fines was appropriated by the lord.

The life of the serf was not easy. Lucky indeed was he if he could feed himself and his family after satisfying the demands of his lord. He labored from dawn till dusk in an interminable round of duties. His cottage, built of wattle or possibly of stone, had a thatched roof and clay floor. There were a hearth, a table, workbenches, and a chest. Beds were not common. Glass was unknown; windows were openings to let in air and light. Stables and barns adjoined the houses and were covered by the same roof. Sometimes there was no partition between the living quarters and those occupied by the cattle. But, difficult as the life of peasants was, manorial methods had their advantages. Every peasant had some land from which he derived an income. Barring times of famine, which were not uncommon, no peasant starved. The significance of the medieval manor is that it supported a large population

which, contrary to the usual impression, steadily increased during feudal times.

THE THREE- AND TWO-FIELD SYSTEMS. Methods of raising crops on medieval manors were complicated and are difficult to explain. A three-year system of rotating crops was general. By this method, some strips in one year produced wheat or rye and in the following oats or barley and in the third year were left fallow, a practice beneficial in respect to conserving fertility and checking weeds. To have one field of wheat, one of oats, and one lying fallow each year the manor must have at least nine open fields.

The three-field system of tillage was introduced, it appears, during early Carolingian times, but historians have never explained fully why it was adopted. There were at least two motives, but before these can be comprehended the two-field system must be explained. Under this method, the usual one during the early Dark Ages, fields lay fallow every other year. To keep a field fallow at least two plowings were necessary. In the two-field system, two such plowings were required every second year; in the three-field system, only every third year. It was evident that much labor might be saved if a three-field system were adopted, and this may well have been the reason why it became common. A second motive perhaps was the discovery that a spring sowing of oats or barley following a crop of wheat did not exhaust the soil so rapidly. The three-field system has been hailed as a remarkable achievement in the history of agriculture; it produced more grain, in greater variety, and with less labor. The resulting prosperity was possibly one of the reasons why the manorial population increased during the ninth, tenth, and eleventh centuries.

CATTLE RAISING. Cattle raising made little if any progress during the Middle Ages, for little attention was paid to scientific breeding. Cows, pigs, and sheep therefore remained small. The great quantity of milk and butterfat produced by a prize cow on a modern dairy farm was quite unheard of. Fleeces remained small when compared with those of modern sheep. Scientific feeding was out of the question because the amount of hay raised was barely enough to keep cattle through the winter, and every fall it was necessary to kill some of the animals. The scarcity of hay was due to a universal ignorance, at least during earlier centuries, about such succulent plants as clover. The medieval peasant relied upon such grasses as nature produced in the permanent meadows. Another point rarely understood by medieval cultivators was the importance of manure. The value of clover and stable manure in building up the fertility of the soil was not recognized until the fourteenth century.

New Uses for the Horse and New Type of Harness. The employment of the horse in farm work effected great changes in medieval agricultural methods. Throughout antiquity, plowing and carting were done by oxen, as they still are in some economically backward countries. During pioneer days in our country, farmers used oxen to clear the land of stumps and logs and prepare ground for cultivation. The horse is far speedier than the ox but in antiquity had been employed chiefly for cavalry and to carry burdens for merchants. Travelers used horses on distant journeys. The emperors of the Roman Empire maintained an elaborate posting system whereby messages and imperial officials were rapidly conveyed to the farthest limits of the empire. Horses were also employed to draw light carriages and chariots in the arena.

Before the tenth century, harness was so defective that it was impossible to use horses for heavy draft purposes. A type of harness common among the Romans was composed of a broad belt of leather passed around the neck and another around the body behind the forelegs. The two bands were joined at the top, at which point the traces were attached. The Egyptians and Assyrians used similar types. The great defect of this harness was that the band constricted the windpipe, preventing the horse from drawing a heavy load. Because of this imperfect harness, the full utility of the horse as a draft and work animal was not recognized until the tenth century A.D., when someone invented the horse collar and hame. The horse-collar fitted snugly around the neck but did not impinge upon the windpipe. The hame was a frame of wood that fitted closely to the collar and was fastened to the traces. The collar rested against the horse's shoulder bones, a perfect adaptation to the horse's anatomy. Whereas the old type of harness did not permit a horse to pull a weight of more than a thousand pounds, with this new type the horse could pull a load three times as heavy. Horses were now hitched to wagons, plows, and harrows. Moreover, horseshoes, fastened with nails driven into the hoofs, were invented. In Roman times, iron shoes had been tied to the hoof by means of rope, not nearly so efficient a device.

Being speedier than oxen, horses increased the tempo of life. Fields were plowed more rapidly and wagons hauled greater distances and with greater speed. In ancient times the horse had revolutionized military life; in the tenth century it had a similar effect on agricultural methods. Manorial well-being developed, rural population increased, and villages grew in size.

The Lords. How did the lords, or seigniors, live? Food and other necessaries were produced on the manors. A small amount of money

was collected on one account or another. The lord's manor house and its adjoining lands from which such incomes were derived were called the "demesne." If the lord had but one manor (and there were many lords who owned but one), he was not an important personage. Such a petty lord lived on his manor, rarely leaving it for any length of time. He himself regulated the life of the manor. The great lords, on the contrary, possessed many manors, in some cases thousands, and had ample incomes. Instead of living on one manor or a few manors as

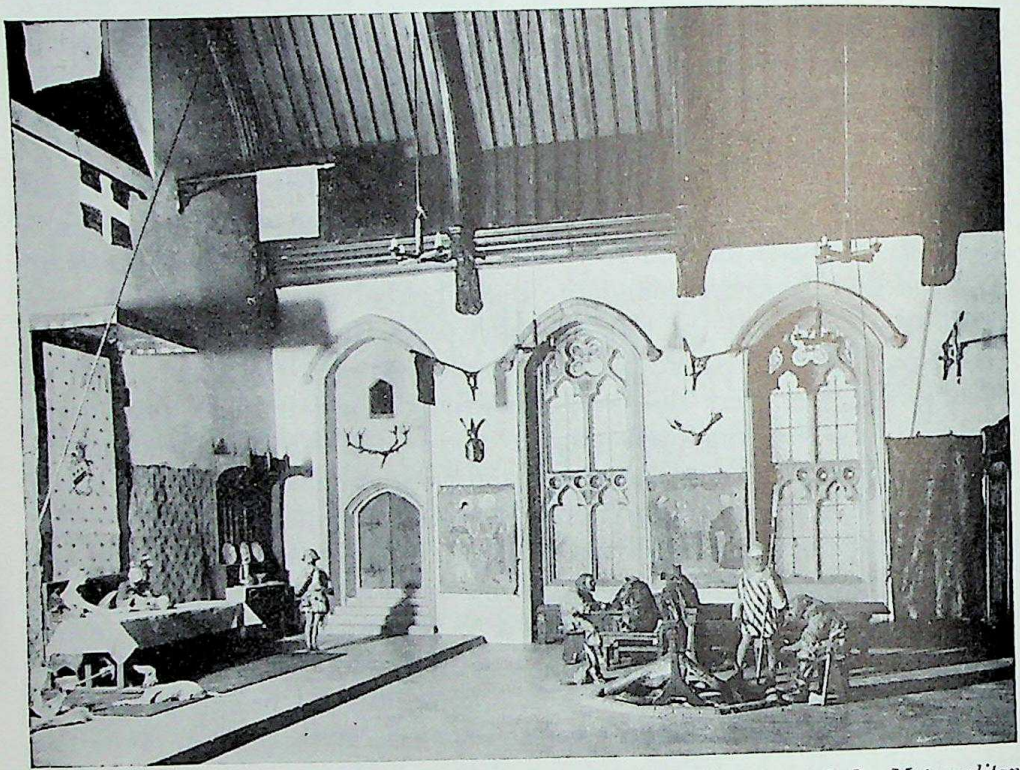


FIG. 60.—Living hall of an English castle, from model. (*Courtesy of the Metropolitan Museum of Art.*)

petty lords did, they traveled with their wives, children, servants, and officers from one estate to another. It was easier for the lord's household to move to a place where food and other supplies had been stored than to transport the supplies a great distance. When such stores were exhausted, the lord and his family moved on. Part of a great lord's duties was to supervise his agents and decide the questions they referred to him. Kings like Charlemagne and Otto I of Germany (*d.* 973) lived in this manner.

FEUDAL GOVERNMENT. It requires a vigorous imagination to re-create the reality of past social, economic, and political conditions. One cannot see serfdom in operation, the teeming life of a city-state, or the

way medieval nobles lived; he must rely exclusively upon his imagination. To understand how the country was governed, we must remember that owners of manors alone had the resources and leisure to look after public affairs. The nobles formed a fighting aristocracy. Medieval society, especially from 850 to 1100, was rough and brutal, and a man's safety depended upon his ability to defend himself and his properties.

To gain protection, lords who owned manors commended themselves and their serfs to more powerful lords, surrendering their property and receiving it back on certain definite terms. The property thus surrendered was called a "fief." The person surrendering and receiving it back was called a "vassal." A manorial lord was one who owned manors; a feudal lord was one who owned manors and had vassals as well. The vassal promised to help his lord in war, give him advice whenever necessary, help ransom him if imprisoned by his enemies, help pay the expenses of knighting his eldest son, and contribute to the dowry of his eldest daughter. In return, the lord promised to secure fair treatment for his vassal and protect him at all times, especially in war.

Obviously, the more vassals a lord commanded, the better he could defend his vassals. Some feudal lords had few vassals, others had many; the duke of Brabant, for example, had as many as two thousand. It finally became customary for feudal lords to grant to their vassals tolls, offices, and sums of money as fiefs and also the right to hold court. Such a court served to advise the lord and decided cases arising between vassals of the lord or between vassals and subvassals.

Feudalism was government by noble fief holders. Such government is called the "feudal system," but so varied and complicated were feudal relationships that there really was not a system at all. Probably it would be better to use the term "feudal complex." Subinfeudation was common, so much so that a vast hierarchy of vassals came into existence. Lord *A*, for example, granted part of his estate as a fief to vassal *B*. *B* as lord granted to *C* a portion of the fief he held of *A*. It is easy to see how subinfeudation greatly complicated feudal relationships. *B* might be a vassal of half a dozen lords and the lord of as many vassals. A vassal might owe military service to two lords at war with each other, in which case it sometimes was hard for him to do his duty toward each. To us who live in a more ordered society the feudal system seems more like feudal anarchy.

Feudal Customs. Customs peculiar to feudal society grew up in large number. Homage and fealty were always associated with the granting of a fief. The following is a contemporary description of the granting of fiefs by the count of Flanders at Bruges in 1127:

> On Thursday the seventh of April, homages were again made to the count, being completed in the following order of faith and security. First they did

their homage thus. The count asked if he was willing to become completely his man, and the other replied, "I am willing," and with clasped hands, surrounded by the hands of the count, they were bound together by a kiss. Secondly, he who had done homage gave his fealty to the representative of the count in these words, "I promise on my faith that I will in future be faithful to Count William and will observe my homage to him completely against all persons in good faith and without deceit," and thirdly, he took his oath to this upon the relics of the saints. Afterward, with a little rod which the count held in his hand, he gave investiture to all who by this agreement had given their security and homage and accompanying oath.

When a fief holder died leaving no lawful heirs, his fiefs "escheated" to the lord who had originally granted them or to his heirs. When there was a legal heir, such heir had to do homage and swear fealty anew. He also paid a "relief," a sum of money for the privilege of succeeding to the properties in question. Wardship was a right exercised by a lord when the lawful heir was too young to discharge military obligations. In such cases the lord managed the fief, appropriating its revenues until the heir's minority had passed. When the heir succeeded to the fiefs, he was obliged to pay a relief. Such were some of the privileges and obligations of nobles. Serfs, it is well to emphasize, did not hold fiefs, do homage, swear fealty, or serve on horseback.

Feudal Kings. What part did kings play in feudal society? They were the heads of complicated networks of feudal relationships. They had large numbers of vassals, who in turn had vassals, who also had vassals. Usually there was much confusion in these arrangements. In general, a weak king tended to become a figurehead. But by carefully watching his vassals a resourceful king might increase his authority. He could extend his rights in connection with wardship and relief. Any violation of the feudal oath by a vassal gave him an opportunity to intervene in the vassal's affairs. In case of treason, he might declare war. If a vassal died without leaving heirs, he might repossess fiefs. A successful feudal king was alert, persistent, and often, as in the case of William the Conqueror, resourceful. Kings also were manorial lords, deriving their incomes almost entirely from manors. Like their vassals, they lived off their own land and paid the expense of government out of their own pockets.

Castles. Feudal society was a fighting society. To protect themselves against their enemies, the greater noblemen built castles. Those of the tenth century were simple, constructed on an elevation surrounded by a palisade and a ditch filled with water. The first castles were made of wood and provided with towers also made of wood. Gradually, palisades were replaced by walls of stone, and the wooden castle gave way to one of stone. During the twelfth and thirteenth centuries, the

stone walls were provided with towers. The castle also contained a large stone tower called a donjon. The great donjon of the castle of Coucy in France was about one hundred and ninety feet high and ninety feet in diameter. At the top of the donjon was a platform for the sentinel. If the enemy carried the ditch and outer walls, the defenders retreated to the donjon, which was easily defended and difficult to capture. Such were the fortified abodes of the great nobles. The petty lord of but a few manors could not afford so expensive a structure. He had to be satisfied with a fortified manor house.

CHIVALRY. Every society has its ideal of a gentleman, and feudal society was no exception to this rule. The medieval nobleman was a fighting man who possessed certain virtues. At the beginning of the Feudal Age, when life was rough and there was much fighting and violence, the ideal man was a successful fighter, brave unto death, true to his word, loyal to his lord, and faithful in protecting vassals. It became desirable to train for the profession of soldier. First a young nobleman served as "page" in some lord's household, then became a "squire," attending the lord and looking after his horse and armor. On reaching manhood, he might become a "knight." To be eligible he had to show proficiency in handling arms and be successful in fighting. If he met all tests, he might be received into the company of knights. This was accomplished by the "accolade," a light blow by the officiating knight struck on the neck of the kneeling squire. At first, no religious services accompanied this ceremony, but in the thirteenth century the squire was required to spend a night in prayer in the church, attend Mass, and listen to a sermon. It cost money to become a knight, for the aspirant had to buy weapons and armor and provide himself, squire, and servants with horses. For this reason, only a few could become knights; others remained squires all their lives.

The word "chivalry," which applies to these knightly customs, is derived from the French *chevalerie*, which in turn comes from the Latin *caballus*, or horse. The fighting of feudal times depended so much on the horse that feudal society has been called "chivalry." The horse has ever since been regarded as an aristocratic animal. Nobles used him in hunting, tournaments, and racing. Until the advent of mechanized units in modern warfare, cavalry was deemed a more honorable branch of service than infantry.

ARMOR. Nobles sought to protect themselves in battle by wearing armor, a custom dating from time immemorial. The knight of the eleventh century wore a conical helmet made of iron, with a piece projecting over his nose. Over his body he wore a coat of mail made of interlinked iron rings. This coat was slashed at the bottom to permit its being tied around the thighs. The legs were not protected. He

carried a kite-shaped shield on his left arm and in his right a heavy double-edged sword. From such beginnings, armor evolved until the most elaborate equipment was produced. By 1500, at the close of the Middle Ages, soldiers appeared incased from head to foot in armor.

Significance of the Medieval Feudality. This feudality has played an important part in civilization. We should not be misled by romances that show knights constantly engaged in fighting or showing off their prowess in the tilting yard. Nor must we assume that this class never did any work, for it actually was charged with the direction of public affairs. In fact, feudal lords in the Middle Ages performed the role that the organized state discharges in modern society. The more we study the documents dealing with the daily life of medieval noblemen, the more it appears that they were actively concerned in managing estates, draining swamps, building dikes, protecting subjects, and encouraging trade. To neglect these interests often created dissatisfaction, as is illustrated by the case of King Edward II of England, who so mismanaged affairs that he was deposed and murdered (1327).

The feudality managed public affairs from 900 to the end of the Middle Ages. Even in modern times, this class long remained important in government, army, and diplomacy. Also, the ideas of chivalry were influential in private and public life. A nobleman's honor, at its best, was a fine thing. It was a new conception and implied truth and uprightness in every relation of life. There were some knights who embodied chivalry's high ideals, though these were not always carried out in practice. An example is furnished by Louis IX of France, whose noble life and just rule were so admired that he came to be regarded as a saint.

Chivalric ideals are illustrated in Sir Thomas Malory's *Morte d'Arthur*, written in England at the close of the Middle Ages. This book, still a widely read classic, has given the modern world its romantic conceptions of medieval chivalry. Poets like Tennyson and Lowell have drawn upon it for some of their finest verse.

The Bayeux Tapestry. The habits of feudal fighting society are well depicted in the Bayeux tapestry. This work of art, dating from about 1120 and measuring 231 feet long and 20 inches wide, commemorates the conquest of England by William the Conqueror (1066). Horses are shown, with riders in chain mail, wearing helmets, seated on saddles, and using stirrups. Some of the scenes depict fighting, others recount the events preceding and following the Battle of Hastings, in which the Anglo-Saxon king Harold was slain. One scene shows how a siege was conducted, another the coronation of a king, who is seated on a throne, holding a sceptor in his right hand and a globe surmounted by a cross in his left. In another scene a crowd stands viewing Halley's comet, which to the imagination of the day portended disasters. The consternation of

the gazers is well depicted. King Harold's funeral is also shown, his body being carried on a bier into Westminster Abbey. The Bayeux tapestry has been described as "the noblest monument in the world relating to English history."

CHURCHMEN IN FEUDAL TIMES. Churchmen shared in feudal and manorial life. Frequently the parish priest was a serf or a villein. He attended to the religious work of the parish, deriving his income from the strips belonging to the parish church and scattered about the fields. He received a "tithe" from villeins and serfs, who also helped him maintain the church buildings. The lord of the manor had the right of "presenting" to the bishop a candidate for the post of parish priest; the bishop "appointed" him.

Bishops lived like manorial lords in that they derived their support from their many manors. The bishop was a feudal lord owing homage and fealty to some lord above him, usually a king or emperor. The archbishop of Cologne, for example, was a vassal of the king of Germany for a large number of fiefs. Bishops also held feudal courts, supervised their manorial agents, and in general discharged the feudal obligations required of lay lords. Monasteries likewise were part of the feudal complex. Each monastery was like a manorial lord in that it possessed a group of manors from which it derived an income. Often its abbot was a feudal lord who did homage, swore fealty, and discharged the feudal obligations usually incumbent upon vassals.

Such, in brief outline, were the manorial and feudal foundations of medieval society. But towns, commerce, and industry were rapidly transforming feudal society, bringing into existence a different kind of life and government. To the revolutionary forces that sprang from such changes we shall turn our attention in the following chapter.

FOR FURTHER READING

BENNETT, H. S.: *Life on the English Manor*, 1150–1400
BOISSONADE, PROSPER: *Life and Work in Medieval Europe*
CHEYNEY, E. P.: *Industrial and Social History of England*
COULTON, G. G.: *The Medieval Scene*
DAVIS, W. S.: *Life on a Medieval Barony*
GRAS, N. S. B.: *A History of Agriculture*
MUNRO, D. C., and G. C. SELLERY: *Medieval Civilization*
NEILSON, NELLIE: *Medieval Agrarian Economy*
POWER, EILEEN: *Medieval People*
SEIGNOBOS, CHARLES: *The Feudal Régime*
STEPHENSON, CARL: *Medieval Feudalism*
TAPPAN, E. M.: *In Feudal Times*

Chapter XXIV

TOWNS AND GUILDS: COMMERCE AND INDUSTRY

Work is the inevitable condition of human life, and work gives happiness to man.—Leo Tolstoy

A REVOLUTIONARY change came over European economic and social life shortly after the year 1000, when commerce revived on a large scale and towns began to develop. To explain this change we must contrast the economic and social conditions during the Dark Ages with the new. Economic life ever since the passing of the Roman Empire in the West had been manorial and rural, essentially based upon an agrarian cultural economy. The manor and the lord's house, the serf and the noble were the chief economic features of this society. But about the year 1000 commercial life began to pulsate, towns sprang into existence, and manufacturing on a large scale revived. Towns, merchants, and guilds soon became as important as the nobleman's castle and the peasant's cottage. "Money economy" created by an ever-increasing volume of new business supplemented the ancient "agricultural economy" and by the close of the Middle Ages had supplanted it in most parts of western Europe. This change, continuing throughout the Middle Ages, was a revolution indeed, and its results are still with us.

Revival of Commerce. Why did European commerce revive in the eleventh century? The causes of social and economic movements are difficult to trace, and often the historian cannot find their first beginnings. Glancing at the map of the Arab world in the ninth and tenth centuries, however, we note one clue. The Arab world embraced the lands of Asia, excepting Asia Minor, as far as the Indus Valley. On the north it extended to the Kirghiz Steppe, on the west to the Atlantic and the Pyrenees Mountains. The Arabs combined more Asiatic lands under their sway than had ever been ruled by any prince since Alexander the Great and governed them most effectively. There was much prosperity; commerce and industry were promoted. Bagdad, Damascus, and Cairo became prosperous centers. A study of the map of the Byzantine Empire further emphasizes the commercial prominence of the Arab world. Constantinople was the economic bridgehead between East and West. Moreover, that city enjoyed a monopoly of silk, silk cloth, brocades, and other articles of luxury, which it sold to the peoples of the West. It is

certain that by 1200 there was more trade with India and the Moluccas than there had ever been in Roman times.

Between 800 and 1050, northern Europe witnessed important movements among the Norsemen of Scandinavia. They left their homelands on frequent excursions, seeking plunder in England, Ireland, France, Germany, and the Slavic countries. They robbed monasteries, murdered, and overthrew governments. But they were traders as well as plunderers. They settled in Iceland and Greenland, trading in walrus tusks and walrus rope. They stimulated commercial activity in France, the Low Countries, Germany, England, Scotland, and Ireland. Some Norsemen even raided the central parts of what is now Russia and traveled by way of the Gulf of Finland, the river Neva, Lake Ladoga, the headwaters of the Dnieper, and the Black Sea to the Byzantine Empire. Trade flourished along this route, and Kiev on the Dnieper and Novgorod on Lake Ilmen became busy centers. From the Black Sea and the Baltic Sea to Greenland and along the vast seacoast of northern Europe the Norsemen founded numerous centers of trade.

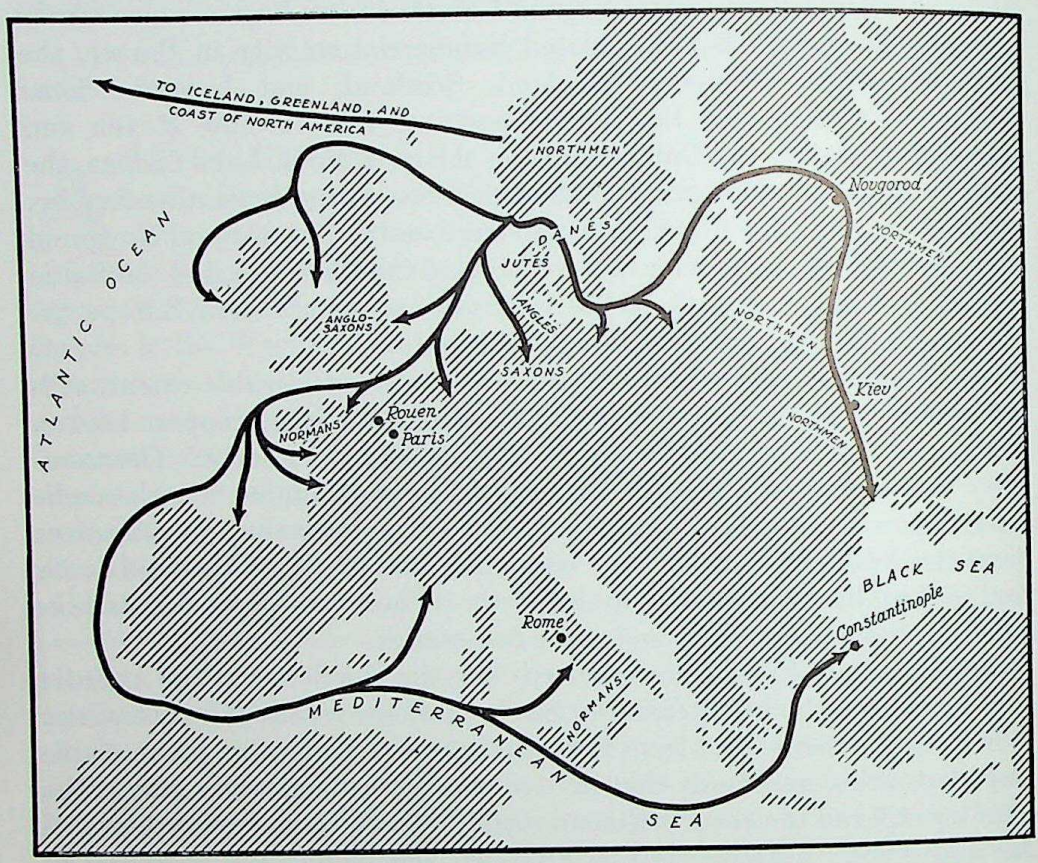
Originally, each medieval manor was, to a considerable extent, self-sufficient. The few articles imported were salt, iron, copper, bronze, millstones, and wine if the manor was situated in the north. Occasionally, foodstuffs were imported, mostly in time of famine. Such conditions began to change about the year 1000, owing to commercial influences from the Arab caliphate and the Byzantine Empire to the east and south and to Scandinavian activity in the north. There was increasing trade in luxuries, foodstuffs, cloth, and other necessaries.

The rivers of Europe flowing north into the North Sea or the Atlantic and south into the Mediterranean Sea became the routes of busy traders. Along the northern coast from Portugal to Scandinavia were innumerable bays, estuaries, and fiords that invited commercial activity. Across the country still ran the ancient Roman roads, over which merchants traveled far and wide. Markets were established, and merchants, organized in caravans, visited them regularly. Closely linked with these routes were the Mediterranean Sea and the Byzantine and Arab East.

Rise of Towns. A town was a center of more intensive business activity than was possible on manors. Its inhabitants supported themselves wholly or in part by commerce, whereas serfs derived their sustenance chiefly from agriculture. Manorial villages favorably situated for trade evolved into urban centers. Towns sprang up at river mouths, at the heads of estuaries, at points where rivers became navigable and where frequently traveled roads met rivers, and at the junctions of rivers. In addition, every rich agricultural region was likely to have its flourishing town; the fertile plain of Lombardy had Milan, the Île de France had Paris, and Brabant had Brussels. Amalfi

and Bari in southern Italy had trade relations with the Byzantine East until Venice, founded during the fifth century, supplanted them. Nearness to the Brenner Pass gave Venice a marked advantage over competitors in trade with the German North.

Towns were fortified places as well as commercial centers. Because the Feudal Age was rough and violent, traders settled where they could find protection. For this reason, towns were also likely to rise near



Map XXIV.—Invasions of the Norsemen.

castles, monasteries, and cathedrals, if these were suitably situated for business. This may plainly be seen even today in those towns which were founded during the eleventh and twelfth centuries. Thus present-day Antwerp still has the thirteenth-century castle of the dukes of Brabant adorning its water front. Bruges was built on the banks of a small stream and around a castle belonging to the counts of Flanders. The castle has vanished, but its small chapel built in the architectural style of the eleventh century still serves as a church. Amiens, Reims, and Salisbury grew up around cathedrals whose magnificent spires still attract the eye. Towns were called "burgs," or fortified places; their trading population was composed of "burghers," or "men of the burg."

What were the earliest towns like? Most of them, as has been pointed out, were situated along a road or a river or at the head of a bay and sprang up because of the busy coming and going of merchants. Usually there was a central square with a number of roads running into it. Houses faced the square; the roads leading into it became streets. As the population increased, side streets were laid out. Streets were crooked and narrow, the result of natural growth; no thought was given to systematic town planning at this early date. There were packhouses where merchants took their wares, and inns for travelers and merchants. Houses were of wood and thatched with straw. In the center of the town, often facing the market, stood a church. If the town lay by the sea or along a river, these arrangements varied somewhat. Seas and rivers were the highroads of the time, and for this reason the market place often was laid out near the water. The Piazza of St. Mark in Venice, for example, was situated only a few rods from the water. Boats from all parts moored at the quay.

Prosperous towns had an exciting history. Successful merchants became dissatisfied with the restrictions of manorial ways and wanted a governmental organization better suited to their needs. They requested favors from the lord in the castle or the bishop in his palace. Sometimes their needs were not recognized, nor were their requests heeded. The merchants then formed a conspiracy, which resulted in a violent and often bloody rebellion. If successful, they established a "commune," a new organization embracing the trading and industrial elements. Henceforth the townsmen governed themselves as they saw fit. The communal movement was strong in Italy, France, and Flanders.

Medieval towns thus were the product of medieval economic conditions. The volume of trade between western and northern Europe and Asia during the twelfth and thirteenth centuries was far greater than that of the Roman Empire. The population of western Europe was correspondingly greater than during Roman days. Consequently, towns in the later Middle Ages were larger and more numerous than ever before. Towns of northern Europe like Reims, Rouen, Ghent, Bruges, Ypres, Brussels, Antwerp, London, York, Nuremberg, Hamburg, Copenhagen, and Bergen were new creations that owed nothing to ancient Roman towns, disproving the theory sometimes put forth that medieval towns were merely revived Roman towns. Some towns like Marseille, Bordeaux, Paris, and Cologne, indeed, date back to Roman times, but trade in them was so slight during the Dark Ages that little connection between these towns in Roman and medieval times can be shown. So we find that Europe after the year 1000 was prosperous, its prosperity more extensive than that of the Roman Empire. Surely this was no "static" society.

MAP XXV.—Chief medieval trade routes of Europe.

MERCHANT GUILDS. Medieval society, organized on a feudal basis, was characterized by much violence and warfare. To protect themselves, merchants formed organizations, the earliest of which was the merchant guild common during the eleventh and twelfth centuries. As its name implies, it was composed chiefly of merchants. There usually was a hall in which the members met to transact business and enjoy each other's society. They made rules, raised money for burials, dowries for daughters of fellow members, and the support of orphans, and engaged in other charitable work. They also took a hand in political matters, for

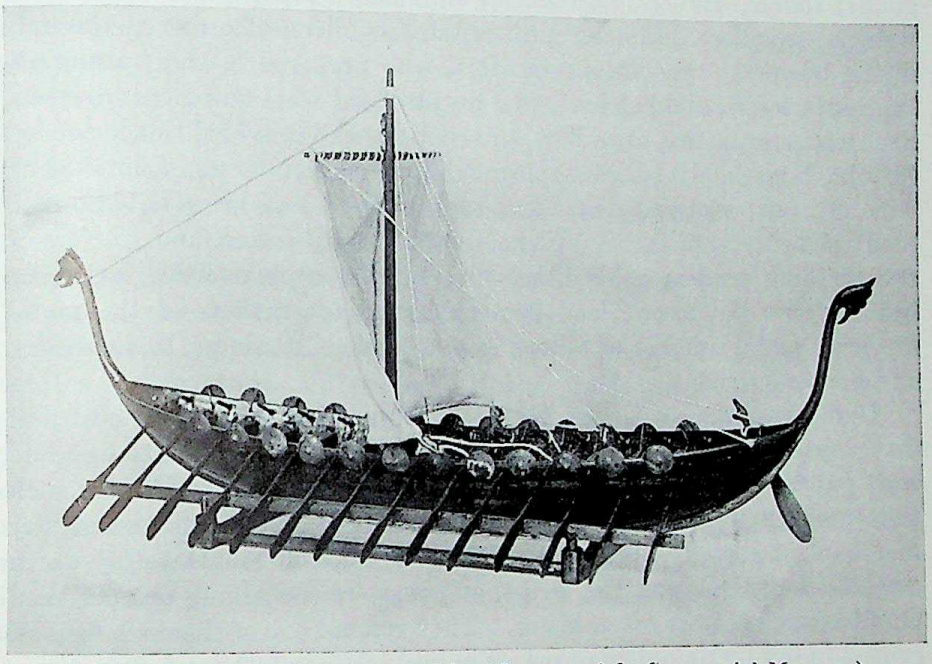


FIG. 61.—A Viking ship, from model. (*Courtesy of the Commercial Museum.*)

they spoke for the collective needs of the towns. They bought up tolls, built bridges, constructed walls and gates, and dug moats. When merchants went on long journeys to markets or distant towns in order to trade, they formed caravans, the organization and protection of which were the special care of the merchant guilds. Mutual aid for protection in a rough and fighting society was their primary purpose.

CRAFT GUILDS. Merchant guilds long managed the business life of towns, but gradually another organization appeared—the craft guild. The reason for its development is that the merchant guilds became wealthy, aristocratic, and exclusive. They disregarded the interests of the humbler workers, mistreated them, and exploited them mercilessly. When the situation became acute in the thirteenth century, workers thought they too should organize to protect themselves. This movement

was most pronounced in advanced industrial centers such as northern Italy, the Rhineland, and the Low Countries, especially Flanders and Brabant.

The reader must not suppose that every trade formed a guild. Usually a number of trades were united into one guild. Only in the largest and most prosperous towns were there many guilds No universally correct statement about their number can be made. The following list of crafts may be regarded as representative of a very large town: mercers, fullers, weavers, dyers, shearmen, and spinners, who constituted the cloth guilds; tailors, glovers, hatmakers, cupmakers, skinners, hosiers, cordwainers, spurriers, lorimers, girdlers, and saddlers, who owned the outfitting business; tanners and curriers, who prepared leather; armorers, smiths, bowyers, and fletchers, who prepared the war equipment; drapers, linen weavers, potters, chandlers, and coopers, who provided things needed for the household; bakers, spicers, butchers, poulterers, fishmongers, wine drawers, vintners, taverners, saucemakers, and brewers, who sold food; carpenters, plasterers, tilers, shipwrights, painters, and glaziers of the building trades; goldsmiths, silversmiths, coppersmiths, latteners, ironmongers, pewterers, lead beaters, and blade makers of the metal business; and a number of others, such as ostlers, mariners, turf carriers, and barber-surgeons.

Organization of Craft Guilds. Organizing workers in crafts at first caused trouble and even violence. Town governments opposed craft guilds and used armed force to prevent their organization, for such governments were in the hands of men chosen from among wealthy merchants naturally opposed to craft guilds, which sought to lay down conditions regarding wages, hours, and matters concerning competition. Guild struggles were often bitter. They remind one of the disturbances caused today by unionizing workers in open-shop industries. Sometimes the guilds were victorious, as in Flanders during the decade before 1302, the date of the Battle of Courtrai, in which the organized armed weavers, dyers, and fullers defeated the mounted knights sent against them by the king of France. Sometimes authorities frustrated the demands of craftsmen by banning guilds. Thus the count of Holland in the fourteenth century forbade the organization of crafts in his jurisdiction. The duke of Brabant put down the guilds with great harshness, on one occasion burying the ringleaders alive.

At the head of a craft guild was a group of "masters." These men had mastered their craft, had become successful in their business, and formed a small, close corporation bound by identical interests. They managed the common business of the guild, which included charity, entertainment, religious functions such as processions, the making of new regulations, and the enforcing of old ones. They might also be called on

to appear in military formation on the walls of the town or in the field. Sometimes the masters acquired the right to elect the officials of the town tribunals.

Below the masters were "apprentices." Apprenticeship lasted a number of years, depending upon the craft. A boy was apprenticed by his father to a master for a number of years, on certain specified terms. He was to work for the master, obey him like a son, and conduct himself decently, not stealing, carousing in alehouses, or behaving in a disreputable way. The master promised to feed and clothe him and lodge him in his own home. He might chastise the apprentice if he refused to obey. Apprentices often received a small sum of money as a reward for good behavior. Upon completion of his apprenticeship, a boy became a "journeyman"; that is, he began to work for a wage ("journey" meaning day, from the French *journée*). The capital thus accumulated would enable him ultimately to become a master and open a shop of his own. On the Continent a journeyman often spent some of this time working in several towns. Having learned all he could about his craft, he might set himself up in business, provided that he could deliver a "masterpiece" and pay an initiation fee to the guild masters.

Each guild had regulations drawn up by the masters and enacted into statutes by the town authorities. If the guild was completely self-managing, it elected its wardens and made its own laws. It also appointed overseers, who might at any moment visit the masters at work to see that rules were scrupulously observed. It was not difficult to exercise such supervision, for masters of a given craft occupied a street or group of streets, whole quarters being devoted to particular crafts. Ghent still has its Fullers' Street, Antwerp its Tanners' Street, and London its Ironmongers' Lane. The shops were open in order that overseers might observe the work of masters, apprentices, and journeymen. If they deemed it necessary, overseers might enter by the door to make an examination. Masters who violated the regulations were brought before the guild warden and his council. The most common offenses were the substitution of poor for good materials, failure to make goods of the specified size, and similar dishonest tricks. For such offenses, masters were fined and their goods seized and given to some charitable institution. Sometimes they were sentenced to stand in the pillory, and occasionally they were expelled from the guilds.

The purpose of the guild organization, as we have learned, was mutual protection. For this reason the strictest equality was maintained. Competition was eliminated by the requirement that masters must begin and stop work at specific moments. They might not work by candlelight to produce more for the market, employ their wives and children under a specified age, or invent new tools that would give them an advantage over

their fellow masters. Advertisement was forbidden. This was carried so far at St.-Omer that a law forbade a seller to attract attention by blowing his nose!

Buying and selling were strictly regulated. No peasant was permitted to sell his produce in house-to-house canvass. He was required to display it on the market. It was unlawful for anyone to buy an unharvested crop—a regulation often violated by "engrossers," who sought to profit by keeping supplies from appearing on the market until prices had risen. It was also unlawful to buy goods on the way to market in order to make an extra profit by raising the price. Such culprits were called "forestallers." Another forbidden practice was to buy goods that had been placed on the market, often in large quantities and at a reduced figure, in order to resell them later at a profit. Those who did this were called "regraters." Engrossing, forestalling, and regrating were vigorously punished. The penalties inflicted were seizure of goods, fines, or loss of civil rights. These practices were especially detested because under medieval conditions towns drew their foodstuffs almost entirely from the surrounding countryside, which made it easy for an energetic dealer to "corner" the market and mulct the townsmen.

Large- and Small-scale Industry. To understand the character of medieval industry it is essential to divide it into two classes. The first comprised those activities which satisfied local demands. These were small-scale industries, of which every town had a large number. Among them were those of the bakers, shoemakers, farriers, blacksmiths, carpenters, masons, and many more. Such guilds never became large and, as a rule, remained moderately well-to-do. The second class comprised those industries which produced for a market wider than the town and frequently for a world market. Large-scale industries developed only in certain places, particularly in northern Italy and the Low Countries. The Calimala guild of Florence refinished cloths imported from abroad, imparting a brilliant color that made them a prized article in all markets. The silk manufacturers of Lucca sold quantities of silk cloth to merchants of northern Europe. Milan became famous for its manufacture of iron, and Venice for its brocade. In the Flemish towns of Ghent, Bruges, and Ypres the crafts associated with the cloth trade became numerous. They sold the product of their looms to all parts of Europe. Dinant and Namur were the foremost copper-manufacturing centers of Europe. Hamburg became famous for its brewing, Amsterdam for fishing, and Bordeaux for wine.

Growing Capitalism. Manufacturing woolen cloth was the most important industry of the Middle Ages. More people gained their bread from this business than from any other; the guilds associated with it had a larger membership than others. Vast riches poured into the

pockets of the cloth merchants. So important an industry could not exist within the narrow limits of medieval guild economics. In earlier days, guilds had required little capital to carry on their business. It was impossible to maintain the small-scale regulations of local guilds in the cloth industry, however, because the industry needed great sums of money to maintain its manufacturing and selling processes. In certain centers, especially northern Italy and Flanders, where the making of cloth was a chief industry, it was necessary to import wool from distant places. English wool supplemented by Spanish and Portuguese was most in demand. Native wool was inferior in quality and its use forbidden in making the best cloths. To procure the best wool required a considerable organization of merchants and shippers and large sums of ready cash as well as credit. Money was needed to buy alum, grease, and dyestuffs. These activities alone sufficed to make the cloth industry capitalistic. Because cloth manufactured in Italy and Flanders was sold in distant markets, an elaborate organization was needed to carry on the business of distribution. This also demanded much money. Craftsmen did not have reserves of money to buy and sell; hence, these operations fell into the hands of merchants who had the needed capital and credit. In this way "capitalism"—the employment of money as a commodity in manufacture and commerce—developed rapidly.

The process of producing cloth was so complicated that the guilds alone could not manage it. Wool had to be washed, combed, and oiled; yarn had to be spun, carded, and wound; and cloth had to be woven, fulled, dyed, and finished. The handling of yarn and cloth was the business of the guilds of spinners, carders, weavers, fullers, and dyers. Not one of these had the knowledge needed to manage *all* these processes. Their vision was restricted by the limits of their craft. Nor did they have the money to provide themselves with wool, dyestuffs, and tools. It was inevitable, therefore, that the entire clothmaking business should fall into the hands of a group who had the capital and credit to buy wool, import it, pay for the processes to which it was subjected, and maintain an organization to sell the finished product on the world market. These were the "drapers." So a class of "middlemen" came into existence.

Thus, in the manufacture of woolen cloth, capitalism supplemented the uncapitalistic economy of the early guilds. A similar development is to be noted in other crafts, as, for example, the brewing, metal, and leather industries. This phenomenon became common during the last two or three centuries of the Middle Ages in all industrial centers that provided goods for the world market. It separated by an impassable gulf the workers from their capitalistic employers. Wage earners no longer understood those who hired them, and ill feeling became common. They believed they were exploited and mistreated. Frequently they

rose in rebellion and were put down with severity. Strikes were common. An example is furnished by the uprising in Florence of unorganized workers, called the Ciompi, in 1378. The history of the Flemish towns during the fourteenth century is filled with guild tumults.

The journeymen were particularly dissatisfied. Masters were reluctant to share their monopolies with journeymen by permitting them to set up in business as masters. Prevented from having a business career and condemned to work for meager pay, the journeymen organized into fraternities that directed strikes and sought to raise wages. The problem of the wage earner who earned barely enough to keep body and soul together never was solved and produced bitter discontent.

Effects of Medieval Commerce and Industry. The expansion of commerce and industry in the Middle Ages enabled a greater number of people to earn a living. Europe was more thickly populated at the close of the Middle Ages than ever before. It is practically certain that Constantinople during medieval times, before its sack in 1204, was larger than Rome or Alexandria had ever been. In many places, there was a steady increase in the proportion of townsmen to country dwellers. By 1500, there were more town dwellers than rural folk in Flanders and the duchy of Milan, the two most densely populated parts of Europe. This means that towns became more important than the country in determining the character of social problems at the close of the Middle Ages.

The growth of capitalism also transformed country life. The subtle influences of capital were felt everywhere, and especially in Flanders, the Rhineland, and northern Italy. Peasants sold their surplus products at the town market, and many accumulated cash and began to buy their freedom. Often the lords agreed to convert payments in produce and labor into money rents. At first this seemed advantageous to the lords, but it ultimately proved a loss. The steady growth in the bulk of money cheapened it and made goods and foodstuffs dearer. Because the rents that peasants paid were fixed and as money declined in purchasing value, the lords' effective income steadily declined. Noblemen were impoverished. Serfs became renters and in many cases were freed.

Feudalism likewise changed under the influence of growing capitalism. Not only was its manorial foundation undermined, but noblemen found that the despised craftsmen could at times defeat them, as in the Battle of Courtrai. For a long time afterward the French nobility shuddered when the Flemish craftsmen were mentioned. When properly led and equipped, the townsmen on foot were the equal of mail-clad knights. Because feudal society was a fighting society and a lord's position depended upon his military prowess, the old feudal ways seemed about to come to an end. That end was hastened by the introduction of gun-

powder and the perfecting of firearms. Bullets pierced plate armor and cannon balls helped to batter down castle walls.

JEWS IN MEDIEVAL LIFE. The Jews occupied a special place in medieval society. They had spread over the entire Greco-Roman world by the close of the Roman Empire and during the predominantly agricultural Dark Ages grew in number. They lived in the towns along the Mediterranean coast and on the routes of trade and travel through the interior. Many of them came from Syria, Constantinople, Alexandria, and Greece. They dealt in articles of luxury, which included silks and spices. Such business proved profitable, and they appear to have had almost a monopoly of it. In Charlemagne's day the words "Jew" and "merchant" were practically synonymous.

What part did the Jews have in the revival of commerce and the growth of town life? It is certain that their role has been exaggerated. They of course must have influenced the growth of towns, for Jews were the leading merchants of the Dark Ages. But the revival of trade was so rapid and so widespread that Christians also participated in it. It is also certain that during the last centuries of the Middle Ages the number of Christian merchants greatly exceeded that of the Jewish. Thus when King Edward III of England, who ruled from 1327 to 1377, took up his residence in Antwerp preparatory to an attack upon France, he borrowed vast sums from the merchants of the Low Countries. The names of nearly all of them are known, and also the sums received from each. Only a very few of them were Jews. Further, most industries were in Christian hands. Moneylending became the chief business of Jews. But even in this activity they were not the only businessmen, for Christians also lent money. During the closing years of the Middle Ages the Jews became especially active as pawnbrokers.

Our medieval ancestors were none too generous in their attitude toward the Jew. Society was first of all Christian, and men and women viewed the relations of life from the point of view of the Christian faith. Convinced of the truth of their religion and believing that the Jews had crucified Jesus, medieval Christians viewed them generally with aversion and often with positive hatred. Churchmen as a rule were opposed to persecution of Jews, and popes displayed a laudable tolerance toward them throughout the Middle Ages. But the common people frequently resorted to violence. They were jealous of the Jewish moneylender, who felt no scruple in exacting a high interest rate called usury, a practice forbidden to Christians. The public, sometimes profoundly stirred, on occasion attacked the Jews, who in consequence suffered indignities and violence. Thus, during the First and Second Crusade, whole groups were forcibly baptized. In some instances, entire synagogues were massacred. During pestilences, it was not unusual to accuse Jews of

having poisoned wells. The excited populace during the Black Death in 1348 caused numbers of Jews to be burned alive.

Jews were not regarded as constituting an integral part of medieval society. Constantly exposed to public hostility, they were required by law to live in segregated districts called ghettos. Such Jewish quarters were a regular feature of the towns of Italy, Germany, Poland, Bohemia, and other countries. This segregation offered them a measure of protection. But they also were placed under the guardianship of rulers in return for a regular tax. Hence, medieval princes kept close guard over Jewries so that escape from them was possible only through renouncing Judaism and embracing Christianity.

Such are some of the more prominent aspects of Jewish life as it concerned the economic life of the Middle Ages. It is clear that Jews played an important part in the developing money economy, which caused far-reaching and fundamental changes in medieval society. But the supplanting of the old agricultural economy of manorial times, the freeing of serfs, and the sapping of feudal and manorial institutions were aspects of the evolution of medieval society for which Jews were less responsible than the more numerous Christian populace.

Medieval towns, as well as the commerce, industry, and social organizations upon which they rested, truly exercised a far-reaching influence on the development of medieval society. When their influences are weighed, we can unhesitatingly state that in their day they were as important as the voyages of discovery or the Industrial Revolution. In fact, these two phenomena of modern times would hardly have been possible without the rise of commerce and growth of towns that began about the year 1000.

FOR FURTHER READING

Baldwin, Summerfield: *Business in the Middle Ages*
Boissonade, Prosper: *Life and Work in Medieval Europe*
Cheyney, E. P.: *An Introduction to the Industrial and Social History of England* (rev. ed.)
Huberman, Leo: *Man's Worldly Goods*
Lipson, Ephraim: *The Economic History of England*, Vol. I
Pirenne, Henri: *Belgian Democracy: Its Early History*
———: *Medieval Cities: Their Origins and the Revival of Trade*
Power, Eileen: *Medieval People*
Thompson, J. W.: *Economic and Social History of Europe in the Later Middle Ages* (1300–1530)
———: *Economic and Social History of the Middle Ages*

Chapter XXV

CULTURE INSPIRED BY RELIGION

Before one makes a study of an organism, estimates its value, or even understands it, it is indispensable to know what purpose it serves.—A. D. Sertillanges

NO OTHER institution of medieval Europe exerted so powerful an influence as did the Christian church. All baptized persons belonged to it; and nearly all were baptized since they were born of Christian parents. The church spoke with infallible certitude about man's eternal life. It taught a system of morals that were binding in every human relation. It guided intellectual activity, for it developed theology, philosophy, ethics, literature, and art.

What was the church? It was the company of all who professed Christ, partook of the sacraments, and were governed by lawfully appointed priests who functioned under one visible head, the Pope, or bishop of Rome. According to Catholic teaching whether ancient, medieval, or modern, this church was founded by Christ while on earth, who gave to Peter authority "to loose and bind." This authority was called the "power of the keys," from Matthew 16:19. Christ was king of His church and the fisherman Peter was His lieutenant. The dignity conferred upon Peter passed to Peter's successors, the bishops of Rome.

Organization of the Church. To discharge its mission as teacher of religion and morals and administer its sacraments, the church evolved an elaborate organization. In Chap. XV, we described its chief doctrines and recounted some of its early history; here we give a fuller outline of its offices and functions as they existed during medieval times and as they still exist. The organization of the church is monarchical in character; it functions under the bishop of Rome, who is its head. His authority is great because he is invested with the power of the keys. The organization of the church also is hierarchical; that is, it is governed by a body of officers in successive ranks from the Pope at the head to the parish priest at the foot of the scale.

The word "papacy" is usually applied to the Pope and his assistants, the cardinals and officials in the several branches of the papal court at Rome. The government of the church, which embraced western Europe and parts of Asia and Africa and Greenland, necessitated vast administrative activity. A large number of problems that arose from the purely religious work of the church was disposed of in the three following

tribunals: (1) the Sacred Penitentiary, which had charge of such disciplinary matters as excommunication, interdict, and dispensations; (2) the Roman Rota, a court that tried violations of canon law and cases appealed from episcopal courts; and (3) the Apostolic Signatura, which received appeals from the Roman Rota. Other business that arose from the extensive practical activity of the church was taken care of in a number of offices. Thus, the Datary had charge of correspondence concerning appointments. The Apostolic Chancery issued the bulls making clerical appointments and those dealing with related matters. The Apostolic Camera was the treasury. This vast organization, however, was not completed until the fourteenth century.

The Pope, or bishop of Rome, held office for life, being elected by the clergy of Rome. During the eleventh century the clergy of the principal churches were formed into a college of cardinals. The Pope's authority as bishop of Rome extended over the diocese of Rome. As shepherd of Christ's flock, the first among all bishops in honor and dignity, however, he had special authority throughout the church.

The region over which a bishop exercised his religious authority was called a diocese. The area of dioceses varied greatly, those of Mediterranean lands as a rule being much smaller than those in northern Europe. Dioceses were divided into archdeaneries; over each of these there was an archdeacon who looked after diocesan matters touching the parishes of the archdeanery. The bishop's residence, at the principal church of the diocese, was called the "cathedral," from the Latin *cathedra*, meaning "chair," in allusion to the episcopal throne. The seat of the bishop's authority was called a "see," from the Latin *sedes*, or seat. Bishops were elected by the clergy attached to the cathedral, who formed the cathedral "chapter." Bishops had charge of parish priests, and all questions dealing with diocesan religious matters were settled in their courts. A bishop wore a ring, symbol of his spiritual marriage to the church, and carried a crosier, or shepherd's staff, which typified his work as pastor.

A number of bishoprics formed an archdiocese, the prefix "arch" meaning "chief." The archbishop, a bishop in his own diocese, was elected by the suffragan or electoral bishops of the archdiocese. He possessed special authority over the bishops in that he convoked councils of the clergy of the archdiocese. The symbols of his office were the same as those of bishops save that in addition he wore the pallium, a band of undyed wool with four purple crosses embroidered upon it. The pallium, bestowed by the Pope after the archbishop had been elected, validated his election.

The parish was the smallest unit in the administration of the church. Parishes varied greatly in area; in regions where the population was

sparse, they were large. As a rule, each manor formed a parish; so general was this that in England the word parish finally supplanted the word manor. Candidates for the parish priest's post were "presented" to the bishop, who, if he had no objection, "appointed" them. The right of presentment belonged to the lord of the manor in which the parish church stood. Priests derived their incomes from the land attached to the parish church and from the tithes collected from the manorial population. Their religious duties consisted in administering the sacraments, instructing the people in religion, and keeping up the parish houses and churches.

THE SACRAMENTS. It is difficult for some to understand the tremendous power the church exercised over medieval life and thought. The sacraments, in part at least, were a pedagogical means whereby religious instruction was carried on. Actually, however, they were far more than this, for through them were imparted salvation from eternal destruction and other spiritual favors. A sacrament is an external sign of an inner grace conferred by it. The efficacy of the sacraments was regarded as certain, for according to the teaching of the church they had been instituted by Christ. To receive the benefits of the sacraments a person was required to have the correct mental disposition. There were seven sacraments—baptism, confirmation, penance, Holy Eucharist, matrimony, extreme unction, and holy orders.

Baptism was the first sacrament to be administered in every Christian's life. Normally, it occurred a few days after birth, and earlier if death threatened. The effect of baptism was to remove the guilt of original sin, which man's first parents committed in their rebellion against God. Godfathers and godmothers promised for children what the latter would be required to promise were they old enough to do so. This included a solemn renunciation of evil. The sacrament of baptism initiated one into the church; hence, it is incorrect to state as is sometimes done that in the Middle Ages people were "born into the church."

When a child was old enough to comprehend the teaching of the church, he was confirmed. This sacrament imparted the Holy Spirit, thus giving the recipient strength to be a soldier of Christ and a good Christian. It was administered by the bishop. The confirmed thenceforth was required to confess his sins in order to secure forgiveness. The sacrament of penance, or confession as it was commonly called, consisted in examining one's conscience, feeling true sorrow for the sins committed, making a firm resolution never to commit such sins again, confessing the sins orally, and accepting such penance as the priest saw fit to inflict. The penance was discharged after absolution was given. The sacrament of penance was a marvelously potent agency in regulating religious and moral life. Through it the church impressed upon the pious its conceptions of life and moral obligation.

The Holy Eucharist was the sacrament containing the body and the blood, that is, the very substance of Christ, under the appearances of bread and wine. Its purpose was to make possible for the worshiper a spiritual communion with Christ. The Mass was the repeated sacrifice of Christ for the sins of the world. It differed from the historical sacrifice on Calvary, however, in that it was a painless and bloodless but nevertheless effective repetition of it. The presence of Christ in the bread and wine was called the Real Presence.

So important was the Holy Eucharist that we must here set forth the way in which theologians explained how the body and blood of Christ appeared in the bread and wine. Since the earliest days of the church, it had been taught that the bread and wine *were* Christ's body and blood (for example, St. Paul in I Corinthians 11: 24–25). Theologians and philosophers explained this mystery by means of certain ideas borrowed from Aristotle. Each thing, they asserted, had its "substance" and its "accidents." In the case of bread the accidents were its color, weight, taste, texture, and other qualities. Its substance was its "whatness." In the Holy Eucharist the substance of the bread and the wine was changed into the substance of the body and blood of Christ. The change occurred in such manner that the accidents remained the same. This was the doctrine of "transubstantiation," giving a rational explanation of a profound mystery.

Matrimony also was a sacrament. No valid marriage between Christians could be performed outside the church. Extreme unction was the final sacrament in a man's life. It included confession if the person was not too ill, receiving the Holy Eucharist, and anointing and prayer by the priest. Holy orders was the sacrament whereby the clergy were ordained to administer the sacraments authoritatively. Priests were set aside from other Christians, or laymen, by an ineffaceable priestly character received in holy orders. This sacrament was a guarantee of the valid administration of all the others.

THE CHURCH'S DISCIPLINE. Even though we know that the power of the church pervaded every aspect of medieval life, it is difficult to understand how this extensive control was effected. The sacraments defined and described in the preceding paragraphs placed extensive authority in priestly hands. Zealous priests watched faithfully over the spiritual welfare of their flocks. Each newborn babe was baptized, and each sick or dying person was given extreme unction. Each person was instructed before confirmation and through the sacrament of penance was constantly under priestly supervision. Doing penance was a serious matter, and the roughest feudal nobles gladly discharged the burdensome penalties to win full forgiveness. To show his contrition a knight might give up his profession of arms and engage in charity; a merchant might

establish a hospital or help build a chapel or possibly support some altar. Men and women often entered monasteries to live ascetically and atone for the evil they had done.

What happened to a man who refused to submit to the discipline of the church? He was "excommunicated," that is, cut off from the communion of the faithful. This was serious; for if he should die in mortal sin, his soul might be lost. It was a severe punishment, for not even the members of the excommunicate's family might have anything to do with him. Persons so chastised usually submitted, confessed their error, discharged the penance imposed, and were again received into the church.

Sometimes, however, men stubbornly refused to yield, especially in the case of rulers. In such instances the church might put the whole country under the "interdict." This was more serious than excommunication, for it affected a whole community of persons whether guilty or innocent. The services of the church, save baptism, confession, and extreme unction, were suspended. Thus in 1137 an interdict was laid on certain lands by the bishop of Séèz in Normandy.

> There was no longer heard the sweet chant of divine service, a sound that calms and gladdens the hearts of the faithful. The people were forbidden to enter the churches for the purpose of worshiping God and doors were locked. The music of the bells was silenced and the bodies of the dead lay unburied and putrefying, striking the beholders with fear and horror. The pleasures of marriage were denied to those desiring them and the solemn joys of the church were no longer known.

Secular and Regular Clergy. The clergy were divided into two classes, secular and regular. The former, so called from the Latin *seculum*, or world, served "in the world," that is, not in a monastery, and administered the sacraments, managed the church organization, and disciplined the people. Parish priests, bishops, archbishops, cardinals and Pope, belonged to the secular clergy. The second group, the regular, were so designated because they lived according to a *regula*, the Latin for "rule." Such was the monastic rule of St. Benedict, whose monks had withdrawn from the world to live a life of peace and devotion and possibly engage in study. There was a very large number of the regular clergy, for Benedictine houses were numerous in all parts of western Europe.

The Church and Feudalism. The elaborate clerical organization of the church, which possessed unique authority in faith, morals, and discipline, was confronted with a grave crisis when society became feudalized during the tenth and eleventh centuries—a crisis as serious perhaps as that represented by the rise of Protestantism in the sixteenth century or the policies of present-day totalitarian states, which seek to control the

thoughts and ideals of their subjects. To grasp the nature of the crisis that feudalism presented to the church, the reader should review the nature of the feudal and manorial foundation of society as explained in Chap. XXIII. Parish churches owned lands that formed part of the estates of lords. Bishops were landlords, or seigniors, and often were vassals of a king or another lord.

This feudal relationship was complicated and confusing. It resulted in wholesale corruption, lowered the morality of the clergy as well as the laity, and threatened to ruin the religious mission of the church. Seigniors of manors frequently were guilty of simony, that is, the selling or buying of an ecclesiastical post. The posts of bishops and archbishops sometimes were sold by the feudal lord to whom these officials had to do homage and swear fealty. The result was that feudal lords viewed the church's offices as opportunities for making money.

Another grave abuse was lay investiture. Archbishops, bishops, and abbots owed homage and fealty for their feudal holdings. In order to have vassals who would be faithful at all times, the lords influenced the elections of bishops and abbots. After election, they "invested" bishops with the ring and staff—symbols of the episcopal office. These pertained to the religious office; the feudal lords had no right to bestow what was not theirs to give. So far as the political management of fiefs and administration of justice were concerned, the lords were within their rights when they invested bishops and abbots by bestowing the scepter, the symbol of the "temporalities" held by them. In practice, however, the lords in one ceremony conferred the ring, staff, and scepter. They seemed to think they could bestow the religious office as well as feudal rights. This meant that political princes were likely to control the church, and religious life and discipline were seriously impaired. Lay investiture was a grave offense, earnestly opposed by all who had the interests of the church at heart.

The marriage of the clergy was also a serious danger to the welfare of the church. From ancient times there had been married priests, but the church advocated celibacy as the more perfect state. Many noteworthy priests had been married, as, for example, St. Arnulf, Bishop of Metz and founder of the Carolingian family. The evil of this practice became clear in feudal times. Married clergy might try to make the office of bishop or parish priest hereditary. They might provide endowments for their children out of church lands, a practice that would impoverish the church. Finally, if they had families, the clergy might be drawn into the feuds so characteristic of the time.

Congregation of Cluny. There was much criticism of the conditions described in the preceding paragraphs, but the most effective opposition was made by the Congregation of Cluny, a group of Benedictine

monasteries whose purpose it was to resist the feudalization of manners and morals. The mother house of Cluny in Burgundy was founded in 910. Duke William of Aquitaine and his wife set aside some lands for a monastery but stipulated they be placed forever under the protection of the Holy See and that the abbots be chosen freely. The new monastery was not to be sold, and its abbot was not to be invested by feudal lords. Soon Cluny became the center of a vigorous protest against the vices of feudal society.

Although the Cluniac congregation was Benedictine, it departed from the rule of St. Benedict in several important points. The abbot was head of all the monasteries that joined the congregation. Each daughter house had its prior. The spirit of Cluny was ascetic; the monks lived most austerely. They seldom spoke to each other, communicated by signs, and submitted to flagellation. On the other hand, lavish display was not avoided. The monks sought to heighten the splendor of the religious services. Vestments were gorgeous, and the liturgy was impressive. Before the great altar stood a gilded seven-branched candlestick, 18 feet in height, made of copper and studded with precious stones. Gold and silver vessels were used for the altar.

This magnificence was further heightened by the proportions of the new church dedicated in 1131. Its nave was flanked on each side by two aisles and crossed by a double transept. Some idea of its size may be gained from the fact that it contained twenty-five altars. In the choir was a shrine containing the relics of martyrs. Formerly such remains had rested in the crypt; but the monks preferred to enclose them in a shrine decorated with gold and precious stones and placed in sight of the worshipers. They spared no efforts to make the service impressive, and the fame of Cluny spread far and wide. Its founder had ordered that the monks should practice the old virtue of hospitality. Consequently, many great men of the day visited Cluny, were deeply moved by the solemn beauty of its service, and went on their way convinced of the superiority of the church over every human institution. The purpose of Cluny was to exalt the teachings of the church in every walk of life.

The eleventh century witnessed the beginning of a vigorous religious revival that imparted to the church renewed spiritual energy. All who were scandalized by the corruption and brutality of feudal society were fired by the example of Cluny. This new power enabled the church to cope with the fighting spirit of the feudal lords. It also helped to refine the coarse manners of the age and inspired purer lives, loftier ideals, and nobler deeds. The Cluniac monks powerfully seconded the clergy who sought to restrict brutal warfare. The "Peace of God," proclaimed in many dioceses, declared that churches, chapels, priests, people on their way to worship, and pilgrims traveling to shrines were under the peace of

God and should not be molested. Those daring to disturb such people were excommunicated and their lands placed under interdict. The Cluniac monks, however, were more active in encouraging the "Truce of God," which supplemented the Peace of God. It forbade all fighting from Thursday evening to Monday morning under threat of the same penalties.

Soon Cluny began to influence even the papacy. Its founder, as we have learned, had placed the monastery directly under the protection of the Roman see. From Cluny came the principle that popes should be elected freely without imperial influence. German emperors usually interfered in papal elections and dictated the choice of the popes. Finally, in 1059, an important decree regulating future papal elections was issued by the clergy of Rome without consulting the emperor. Elections were to be held by the bishops and other prominent clergy of Rome to prevent corruption and violence. This document, signed by eighty bishops and deacons, established the college of cardinals, a body of clergy which from that time to the present has functioned at papal elections.

The Investiture Struggle. The vices that threatened the church with ruin—simony, lay investiture, and clerical marriage—became the subject of attack. Gregory VII was Pope from 1073 to 1085, the years during which a bitter quarrel over the question of investitures broke out between himself and the German emperor Henry IV, who ruled from 1056 to 1106. Gregory is believed to have been a monk at Cluny; it is certain that he was deeply influenced by Cluniac ideals. The struggle over investitures is full of striking episodes. Gregory insisted that Henry should abandon simony and give up all efforts to control the elections of bishops. Henry, on the other hand, insisted that it was his right to sell offices, influence elections, and invest bishops with ring and staff as well as scepter.

In his arguments against the demands of Henry, Gregory set forth his ideas about the relations between church and empire and the nature of these two powers. His theory is important; it was held by many thinkers of the Middle Ages. Gregory declared that there were two powers on earth, the church and the empire. God created each of these. The church founded by Christ was instituted to teach men the way of salvation. St. Peter was his spiritual lieutenant; Christ's authority was represented by Peter's successors, the popes of Rome. Established to watch over man's eternal welfare, the church was more important than the empire. The latter was an institution called into existence because man, having fallen from a state of perfection, was wicked and violent. It was established by God, but only for the earthly purpose of checking depraved man. The empire restrained man's wickedness; the church

advanced man's ideal life. Hence, the church was superior to the empire, and the emperor did wrong in practicing simony and lay investiture.

The quarrel over investitures constituted a serious religious and political crisis. Its consequences might have been as significant for medieval civilization as, for example, those of the French Revolution in modern life and thought. If the emperor had persisted in appointing bishops, investing them, and selling church offices, the church would have become a political tool. Zealous churchmen, especially those influenced by the Cluniac ideal, opposed such a degradation of the church. On the other hand, the emperor had some right on his side. Bishops and abbots were vassals owing homage and fealty. Their lands and political powers had originally been bestowed by the emperor. It was natural, therefore, that the emperor should want to control their election. This was his justification for simony and lay investiture. Without such practices the empire, which rested on vassals many of whom were bishops and abbots, could not be maintained and wholesale anarchy would result. Each side had rights, each side demanded too much, and complete victory for either would have been disastrous for both.

The struggle continued after the death of Henry IV. His son Henry V (*d.* 1125) made a concordat, or agreement, with Pope Calixtus II, the famous Concordat of Worms of 1122. Henry gave up the practice of investing with ring and staff and abandoned simony. The Pope, on the other hand, agreed that bishops and abbots were to be elected in the emperor's presence. There was to be no violence or simony. Further, after election, bishops and abbots were to receive the scepter as symbols of the political authority that they held from the emperor and do homage and swear fealty. But an ideal solution was impossible. Laymen everywhere continued to influence elections and control church offices. This caused widespread corruption and produced serious results, one of which was the Reformation, to be described in Chap. XXXIV.

A measure of religious reform resulted in a great increase in church officers and offices. We have learned how the college of cardinals began to act as an electoral body. Seeking to regulate moral life, the Pope received many cases in appeal from diocesan courts. Beginning with the pontificate of Gregory VII, legates, or nuncios, were sent to represent the Pope at the courts of princes. This activity necessitated the appointment of numerous officials. The administrative activity of the papacy increased greatly. Such were some of the forces that created and perfected the medieval church organization.

The Greek Schism. All Christian Europe had hitherto belonged to one church, which traced its descent directly from apostolic days. We have learned how the barbarian Celts, Germans, and Slavs were brought into a fuller participation in the heritage of ancient and Greco-Roman

culture. The civilizing work of the church in this respect is one of the great themes of history. Now, however the church split into two halves, the Latin, Celtic, and Germanic West, and the Greek and Slavic East. This is known as the Greek Schism and occurred in 1054. There had long been misunderstandings and differences of opinion between Rome and Constantinople. The former was Latin in culture, the latter Greek. The Patriarch of Constantinople, jealous of the Pope of Rome, denied the claims of St. Peter. There also were differences in dogma. Misunderstanding increased until finally papal legates appeared in Constantinople and placed a decree of excommunication on the altar of St. Sophia. From this moment, there was a Roman Catholic church in the West, and a Greek church in the East.

The Carthusian Order. Monasticism remained popular throughout the Middle Ages. Many new orders were organized, among which there was great diversity. The first of these was the Carthusian, founded in 1084. Its basic idea was ascetic self-denial, seemingly lacking in the older Benedictine foundations and the Cluniac congregation. Its founder was St. Bruno of Cologne, who retired with a small group to an inaccessible spot in Burgundy called Chartreuse. These men wished to follow the example of St. Pachomius in Egypt. Each monk was to live in a cell surrounded by a plot of ground, there to work and spend his time in devotions. The monks came together in the common church only at matins and vespers. In this respect, the rule differed from the Benedictine, which required that the monks should live together. Another peculiarity was that they were forbidden to own much land. The Benedictine houses often had wide estates, the Carthusian only small plots. The Carthusians kept sheep, which they pastured in the wilderness; from the money they received for hides, they bought food and other necessaries. They avoided all pomp and show in their religious services. The Carthusian order persistently clung to this ascetic way of living for six centuries.

The Cistercian Order. The Cistercian order was founded in 1098. Displeased with the splendor of Cluniac monasteries, a group of men established themselves in the wooded tract at Citeaux near Dijon in Burgundy. They were determined to train themselves in the school of poverty and self-denial. Their services were extremely plain, their vestments of fustian or linen. Their great candlestick was made, not of gilded copper studded with precious stones, but of iron. Altar cloths were made of linen; all glitter and splendor were avoided. The same studied simplicity was insisted on in private life; their beds, dress, and diet were severely plain. The Cistercians followed the Benedictine rule but, in opposition to the practices of the Cluniacs, insisted upon manual

labor. Their monasteries were built in remote, wooded, or marshy regions.

In spite of their original protest against the lavish show of Cluniac houses the Cistercians became wealthy. In Yorkshire and other parts of northern England, they converted the marshy thickets into valuable sheepwalks. Most of the wool produced in England was raised on lands belonging to Cistercian monasteries. In Friesland the Cistercians built dikes and drained extensive swamps. In Burgundy, they created vineyards. Their greatest figure was St. Bernard of Clairvaux (*d.* 1153). Their fame spread widely; by 1152, their order boasted 330 houses scattered in France, Spain, Italy, Germany, the Low Countries, and England.

The Premonstratensian Order. The Premonstratensian order was founded in 1120. It differed from the Benedictine, Carthusian, and Cistercian orders in that its members were priests as well as monks. Hitherto most members of orders were monks who never became priests. The Premonstratensian rule was not Benedictine but was borrowed, in part at least, from St. Augustine (*d.* 430), who had tried to found a monastery of priests. Others had followed his example, notably Bishop Chrodegang of Metz (*d.* 766), who required the priests, or canons, of his cathedral to live together under a common rule.

St. Norbert founded the first Premonstratensian house near Laon in France. Since his canons preached, taught, heard confessions, and performed priestly duties, Premonstratensian houses were established near towns, where they could be of service to the people. The order is interesting because it was the first monastic institution of the Middle Ages to adapt its mode of religious life to the needs of townsmen. Its example was to be imitated repeatedly, for instance, by the Franciscans and the Dominicans. From the beginning, Premonstratensian canons had abundant opportunity to combat the growing number of heretics in the towns. St. Norbert also labored with great success among the still heathen Slavs east of the Elbe River. His order became extremely popular and founded houses throughout western Europe.

Military Orders. A number of military orders appeared during the Middle Ages, combining the ascetic ideal of monastic life with a military or charitable aspect of crusading activity. The Knights Hospitalers, or Knights of St. John of Jerusalem, were organized shortly after the First Crusade. They owned a monastery in Jerusalem; in their hospital adjoining it, they received sick and poor pilgrims who had come to worship in the holy places. The order had hospitals also at Bethlehem, Tyre, Antioch, Acre, and Alexandria. They received as gifts many houses and parcels of land. In course of time, they amassed property in the towns of western Europe. The order lived according to the rule of

St. Augustine. A grand master directed the Knights, who took the vows of poverty, celibacy, and obedience.

The Templars, founded in 1118, derived their name from the fact that their first house stood near the Temple in Jerusalem. Their purpose was to defend the newly formed kingdom of Jerusalem, though they also took the vows of poverty, celibacy, and obedience, adopted the Cistercian rule, and lived in great austerity. The order became famous, and people lavished wealth upon these champions of Christendom and protectors of the sacred places.

Charitable Orders. Orders were founded to take care of the destitute poor in the new commercial and industrial centers. Charity was a chief Christian virtue actively inculcated from earliest times. The Order of Fontevrault, founded in 1101 by Robert of Abrissel in Brittany, generously distributed alms and established houses for lepers. These unfortunates were common in the Middle Ages before the practice of bathing became popular in the newly founded towns. The order went so far in its zeal for charity as to welcome abandoned women of all ages, a practice that brought some criticism upon the monks, in spite of their undeniably praiseworthy purpose. The Order of the Hospital Brothers of St. Anthony, founded in 1091, erected throughout western Europe, hospitals for those suffering from all kinds of ailment though primarily for victims of St. Anthony's fire. This painful disease, common in medieval and even in modern times, is caused by eating bread made from ergot-infested grain. Ergot constricts the blood vessels and interferes with the circulation, often stopping it completely, especially in the hands and feet. St. Anthony's fire was not diagnosed correctly until about a century ago. The modern process of threshing and bolting flour eliminates all ergot-infested grain. The Brotherhood of the Holy Ghost, founded about 1150 by Guy of Montpellier, also had many hospitals. They cared for the sick and poor and likewise did important work among the proletariat.

A peculiarity of the orders and groups that devoted themselves to charity was that they were lay or partly lay in character and yet retained some monastic features, the Beguines, for example, who became popular in the Low Countries and in the adjacent parts of France and Germany. The date of their first appearance cannot be determined, but they became numerous early in the thirteenth century. The Beguines were women who established houses called *beguinages* near hospitals and churches. They lived according to a rule, supported themselves by their handiwork, performed charitable work, tended the poor and sick, and taught school. They took the vows of poverty and obedience, but not of celibacy. Some towns in Belgium still possess ancient beguinages. Ghent, for example, has a large one surrounded by a wall—in fact, a little city by itself. The Beghards were a similar group of men organized for charitable work

and edification. They usually supported themselves as weavers, dyers, and fullers; in fact, such handicraftsmen often formed a house of Beghards.

Each town had one or more lazar houses, ordinary houses that had been given by laymen for the reception of lepers and other unfortunates. They were often endowed, the incomes supporting brothers or sisters who looked after the inmates. But these institutions were not sufficient to meet the growing problem of the poor. Finally, in many towns of the Low Countries, laymen formed associations called "Tables of the Holy Ghost" to take care of the needy. They received gifts and distributed food, clothing, and other necessaries. Parish priests were frequently associated with the laymen in the work of these Tables of the Holy Ghost.

The Albigensians. Although the church had deeply entrenched itself in medieval life, its position was not unchallenged. A formidable crisis appeared during the thirteenth century— the rise of the Albigensian heresy, which threatened to ruin Catholic leadership in politics, society, economic life, art, and thought. It descended from the ancient Manichaean heresy against which St. Augustine had carried on a relentless struggle. Its teaching was a hodgepodge of pagan and Christian ideas. The Albigensians taught that there were two forces—good and evil—locked in eternal combat. The force of good associated with spirit, that of evil with matter. The material creation was the result of the struggle between these forces. The Creator of the universe could not have been the beneficent Father of Christian theology. The God of the Old Testament was evil. Christ, who was God, could not have appeared in the material form of a human body. The Holy Eucharist could not be a true sacrament, because Christ could not be present under the material forms of bread and wine. Marriage was an evil, for it perpetuated material human beings. The Pope was not the successor of St. Peter but of the Emperor Constantine, since he had wealth and political power. All in all, the Catholic faith therefore was wicked, her sacraments false, and her teachings not to be obeyed.

The Albigensians had one initiatory sacrament, the *Consolamentum*, in which the recipient renounced the Catholic faith. Much of their teaching related to matters of sex, which they abhorred. It was a grave sin for a man to touch a woman even in the most inoffensive manner. A pregnant woman who died before the birth of her child was irretrievably lost. Such extreme views made life as the average human being must live it impossible. The way out of this difficulty for the faithful was the *endura*, or suicide. This was believed to be laudable, for it freed the soul from all contact with material things. Some put an end to their lives by fasting unto death, some drank poison, others opened their veins in the

bath. Parents even forced the terrible endura upon their children. Could there be anything more praiseworthy than to relieve the souls of infants from the necessity of a life contaminated by matter?

It is not surprising that both the Albigensians and their antisocial teachings were distrusted. They threatened to destroy the church, one of the chief elements in the medieval cultural complex. Furthermore, the heretics were objectionable on political grounds. They were opposed to the practice of giving oaths in courts and at public ceremonies. In the Middle Ages the act of homage that noblemen, bishops, abbots, officers of communes, and many officials performed was sealed by oath taken in the presence of witnesses. This was even more important than the modern practice of affixing signatures. The Albigensians refused to take oaths, basing their objection on Matthew 5:37. They also refused to perform military service, holding that it was unlawful for the state to take the life of criminals. Such teachings aroused hatred in a society which rested on homage and in which chivalry was an important ideal. In no age will men permit the chief institutions of public or private life to be ruined. The people of the thirteenth century rallied to the church and the princes and refused to tolerate the Albigensians. Out of this spirit came the Inquisition, a court created to uproot all traces of Albigensian teaching.

THE INQUISITION. The Inquisition is usually referred to with a shudder, and the most lurid stories are told about it. That it often resorted to violent methods is true, but these should not be exaggerated. Throughout the Dark Ages, churchmen held that compulsion in religion was not permitted. But with the growth of heresy during the investiture quarrels the people, when thoroughly enraged, began to burn heretics. The Albigensians became so numerous in Italy and southern France during the twelfth century that the bishops could not cope with the situation. They were then ordered by the Pope and the Emperor Frederick Barbarossa to visit the parishes of their dioceses regularly, conduct an inquest (the word "inquisition" is derived from the Latin *inquisitio*, or inquest), and condemn those who refused to be instructed. Such persons, expelled from the church, were handed over to the officers of the state, or the "secular arm" as it was commonly called. The chief penalty was the confiscation of property and banishment. This, of course, was more humane than the fanatical popular practice of burning at the stake, which became all too common.

Under the Emperor Frederick II, who ruled from 1212 to 1250, the character of the Inquisition changed greatly. He issued a law in 1224 that condemned heretics to be burned or to have their tongues cut out. Some of the clergy reasoned that because a heretic was a traitor to God he at least deserved the punishment inflicted upon those who betrayed the

state. It is sad to learn how Gregory IX, Pope from 1227 to 1241, insisted that the imperial penalty of burning relapsed heretics be enforced. The next step in the development of the Inquisition, also taken at this time, was to withdraw the tribunal from the hands of bishops and entrust it to Dominicans and Franciscans, two orders that had recently come into existence. These wandering friars were more free to act than the bishops because they were not restrained by local conditions. Finally Innocent IV, Pope from 1243 to 1254, legalized the use of torture, following the example of secular courts, which for some time had employed it.

Upon arrival in the diocese, the inquisitor summoned the clergy and laity and preached a sermon on the true faith. All who had had any connection with heresy were urged to confess and do penance. This was virtually all that was required of first offenders or of anyone willing to be instructed. Determined heretics who did not take advantage of this clemency were not treated so leniently. The people were urged to lodge complaints, which became the basis of trial. The accused was not allowed to face his accusers, nor did he have the help of an attorney. Upon recantation at any stage, especially if the accused had never before appeared before the Inquisition, the heretic suffered such punishments as imprisonment, banishment, destruction of his house, or going on a pilgrimage. A relapsed heretic was sentenced to life imprisonment or was handed over to the secular arm, that is, to the state, whose officials stood ready to inflict the extreme penalty that governments came to exact of heretics.

The Inquisition is a blot on the history of the Middle Ages even though it stamped out the Albigensian heresy and reestablished religious unity. Humanitarian sentiments have revolted against the idea that punishment in life and limb should be inflicted for heresy or even for civil or criminal offenses. These severe methods were not universally approved during the Dark Ages; in fact, it can be shown that the best traditions of the church were opposed to them. Torture and the death penalty were approved, however, by the majority of the population. Further, tolerance is not a universal virtue, and the Middle Ages were not tolerant. But this does not relieve of blame churchmen who advocated torture and the death penalty for heresy. The Inquisition was an error, and no one today thinks of defending it. On the other hand, its severity should not be exaggerated. Not everyone who appeared before it was thrust out of the church and burned. Thus Bernard Guy, an inquisitor for 15 years in Carcassonne during the thirteenth century, sentenced 930 persons, of whom only 42, or 4½ per cent, were surrendered to the secular arm.

St. Francis of Assisi. The Order of the Friars Minor was founded by St. Francis (about 1181–1226), one of the most remarkable and lovable

characters that ever lived. He belonged to the wealthy merchant group of Assisi, a town in central Italy, where he lived a carefree existence, taking no thought of the problems of life. Suddenly he renounced his worldly wealth and turned to religion. St. Francis exemplifies what is best and finest in medieval Christianity. He spent his time in solitude and prayer and helping the poor, who were all too numerous in medieval towns. He tended lepers in hospitals. At length he seemed to hear the words of Jesus as recorded in Matthew 10: 7–10 and thenceforth devoted himself to preaching to the poor and destitute in the towns of Umbria. The people received him with enthusiasm, for here was a preacher who spoke to them in the mother tongue and taught the gospel of Christ.

The genius of St. Francis is revealed in the *Little Flowers of St. Francis*, a volume of pious stories about the saint. Collected some time after his death, they are not to be regarded as historically accurate but do convey a vivid impression of the saint's personality. St. Francis loved all nature—plants, animals, and inanimate objects. He knew that God was their creator and because God was good these created things were also good, fair, and worthy of love. His love of the animal world is revealed in the sermon to a flock of birds. The story is that St. Clare, one of his devoted followers, found him on one occasion discoursing to them as follows:

> My little sisters the birds, much are ye beholden to God your Creator and alway and in every place ye ought to praise Him for that He hath given you a double and a triple vesture; He hath given you freedom to go into every place, and also did preserve the seed of you in the ark of Noe, in order that your kind might not perish from the earth. Again, ye are beholden to Him for the element of air which He hath appointed for you; moreover, ye sow not, neither do ye reap, and God feedeth you and giveth you the rivers and the fountains for your drink; He giveth you the mountains and the valleys for your refuge, and the tall trees wherein to build your nests, and forasmuch as ye can neither spin nor sew God clotheth you; you and your children: wherefore your Creator loveth you much, since He hath dealt so bounteously with you; and therefore beware, little sisters mine, of the sin of ingratitude, but ever strive and praise God.

The story of the fierce wolf of Gubbio is a famous one. The wolf had destroyed the flocks and had even killed some men, but he suddenly desisted on seeing St. Francis, who spoke to him as follows:

> Friar wolf, thou workest much evil in these parts and hast wrought grievous ill, destroying and slaying God's creatures without His leave; and not only hast thou slain and devoured the beasts of the field, but thou hast dared to destroy and slay men in the image of God; wherefore thou art worthy of the gallows as a most wicked thief and murderer: all folk cry out and murmur against thee, and all this city is at enmity with thee.

The wolf agreed to give up his forays in return for daily food. Together they went to the public square of Gubbio, and St. Francis told the people what the wolf had promised. The townsmen agreed to give him food as long as he lived. Turning to the wolf, St. Francis spoke these words:

"And thou, friar wolf, dost promise to observe the conditions of this peace before all this people and that thou wilt injure neither man nor beast nor any living creature?" And the wolf knelt down and bowed his head, and with gentle movements of tail and body and ears, showed by all possible tokens his will to observe every pact of peace. Says St. Francis, "I desire, friar wolf, that even as thou didst pledge thy faith to me without the city gates to hold fast thy promise, so here, before all this people, thou shalt renew thy pledge and promise thou wilt never play me, thy bondsman, false." Then the wolf, lifting his right paw, placed it in the hand of St. Francis.

The faith of St. Francis was a baffling profundity—the faith, nevertheless, of a man who saw simply and clearly. This is the spirit of his *Canticle of the Sun*, one of the greatest of religious poems.

Most High, Omnipotent, Good Lord.
Thine be the praise, the glory, the honour, and all benediction.
To Thee alone, Most High, they are due,
and no man is worthy to mention Thee.

Be Thou praised, my lord, with all Thy creatures, above all Brother Sun,
who gives the day and lightens us therewith.

And he is beautiful and radiant with great splendour,
of Thee, Most High, he bears similitude.

Be Thou praised, my Lord, of Sister Moon and the stars,
in the heaven hast Thou formed them, clear and precious and comely.

Be Thou praised, my Lord, of Brother Wind,
and of the air, and the cloud, and of fair and of all weather, by which Thou givest to Thy creatures sustenance.

Be Thou praised, my Lord, of Sister Water,
which is much useful and humble and precious and pure.

Be Thou praised, my Lord, of Brother Fire,
by which Thou hast lightened the night,
and he is beautiful and joyful and robust and strong.

Be Thou praised, my Lord, of our Sister Mother Earth,
which sustains and hath us in rule,
and produces divers fruits with coloured flowers and herbs.

Be Thou praised, my Lord, of those who pardon for Thy love and endure sickness and tribulations.

Blessed are they who will endure it in peace,
for by Thee, Most High, they shall be crowned.

Be Thou praised, my Lord, of our Sister Bodily Death,
from whom no man living may escape.
Woe to those who die in mortal sin:

Blessed are they who are found in Thy most holy will,
for the second death shall not work them ill.

Praise ye and bless my Lord, and give Him thanks,
and serve Him with great humility.[1]

It was not long before disciples joined St. Francis. With twelve of these he went to Rome to beg from Innocent III, Pope from 1198 to 1216, permission to create an order, which was granted in 1210. The purpose of the first Franciscan order, the Friars Minor, was to imitate the example of Jesus. The members, called "brothers" or "friars" (from the Latin *frater*, or brother), traveled in pairs throughout the country, preaching and comforting the poor. The first Franciscans were laymen who lived according to a rule but were not priests. This was the first order which combined the monastic ideal with the life of laymen. The friars supported themselves by working in the fields. When they could not earn their bread, they begged for it. They slept in fields and under hedges. They were always happy, joyfully preaching the precepts of the faith and urging their hearers to confess and do penance. Their main principle seems paradoxical to modern folk who think that without material goods life is empty. "Poverty," the followers of St. Francis said, "consists in having nothing and desiring nothing, yet in all things

[1] Quotations from "*The Little Flowers*" *and the Life of St. Francis with the* "*Mirror of Perfection,*" pp. 38–41, 29–30, 294–295, Everyman's Library. J. M. Dent & Sons, Ltd., London.

is the spirit of liberty." By "liberty" was meant the spiritual freedom that Jesus' teaching gave them.

The Franciscan order became immensely popular. Absolute poverty and practical Christian conduct won for them the enthusiastic support of the proletariat. This was important at a time when the church, because of its vast wealth and power, seemed to be losing contact with some of the people. The towns of Italy, France, and Germany were thronging with Albigensian teachers. The Friars Minor, or "Lesser Brethren," helped to save the day by insisting upon the social implications of Christian teaching. By teaching the poor, feeding the hungry, and clothing the destitute they gained for the church the loyalty of the poor. Every town soon had its Franciscan convent.

The Second Order, or Poor Clares, as they were affectionately called, was instituted in 1212. They were the feminine counterpart of the Franciscan friars and were founded by St. Clare, a daughter of one of the wealthy townsmen of Assisi, early attracted by the piety of St. Francis. St. Francis' teachings were greatly admired by laymen, who founded a Third Order, the Tertiaries, or Brothers and Sisters of Penance. The Franciscans, first exclusively urban order to be created in the Middle Ages, illustrates the remarkable capacity of the church to adjust itself to changing social conditions.

The Dominican Order. The Spaniard St. Dominic (1170–1221) founded the Dominican order in 1216. A priest eager to bring the Albigensians back into the church, he attracted a small group of followers who labored in Toulouse, where they successfully refuted heretical arguments. Like the Franciscans, absolute poverty was their rule. The Dominicans lived on alms and so, with the Franciscans, were called "mendicants" or "begging friars." They also became extremely popular among the people, for they taught them and worked with them. The Dominicans from the beginning were deeply interested in learning, a natural result of their original purpose, which was to confute the arguments of heretics. Because of this combatant purpose the order at first was known as the Soldiery of Christ. Many learned Dominicans became professors of theology in the rising universities.

Social Importance of Indulgences. In no way perhaps is the far-reaching influence of the medieval church better illustrated than in the practice of indulgences. Unfortunately, their nature and significance are often misunderstood. Indulgences were granted for the removal of the penalty for sin, *not* the guilt of sin, which is freely forgiven by God, and they were effective only after a person had duly confessed his sin. It was the custom in earlier times for priests to inflict severe penances that invalids, soldiers, prisoners, and others frequently could not discharge, even with the best intentions. Priests therefore made

substitutions in the confessional. These were indulgences and remitted all or part of the penalties imposed. Recipients usually made grants of money to be used in furthering some good work, though sometimes personal labor was substituted. It should be borne in mind that the immediate object in an indulgence was never money, but rather the moral and religious discipline resulting from the sacrifice involved.

Some indulgences were for the purpose of building churches. The cathedral of Speyer, for example, was repaired with money raised from indulgences after it had suffered from a fire in 1450. Many a church was decorated with sculptures and paintings or provided with chapels, pulpits, altars, towers, or bells by the same means. Hospitals and charitable institutions were paid for by indulgences. Crusaders often were given indulgences. Finally, many socially valuable projects such as the construction of dams, dikes, roads, harbors, and fortifications, the colonization of vacant lands, and the formation of guilds for the development of piety were rewarded by indulgences. As such grants were numerous, it is obvious that indulgences were most important in the moral, artistic, and social life of the Middle Ages.

THE CALENDAR. The influence of religion is reflected also in the way men of the Middle Ages dated the happenings of their time. The system that we employ today comes from the time of the Roman Empire and was in use during the Middle Ages. But so powerful was religion that people dated everything according to saints' days. Instead of "June 24, 1330," they wrote "Feast of St. John the Baptist, 1330." Often they dated events according to the movable feasts of the church, which complicated the reckoning. Nearly every Sunday was numbered according to whether it fell before or after Easter. Each weekday might be numbered with reference to some Sunday. An event might be dated "Monday after the Second Sunday after Easter." To identify such dates, one had to know on which day of the year in question Easter Sunday had fallen. This was rendered still more complicated by the fact that in France and some other lands the new year began with Easter.

Thus we see that religion inspired many of the basic forces in medieval civilization. From its inception the Christian church had taught a consistent view of life and inspired a lofty conception of ethical conduct inculcated especially through sacramental ministration. The sacrament of penance was particularly significant, for thereby the confessor examined the conscience of the faithful and guided practical moral conduct. The success of the church should not be exaggerated. All too often, individuals did not practice what they professed. Also, the clergy sometimes were unfit, a condition that interfered with the efficacy of the church. Nevertheless, from the workaday world of the Middle Ages, many striking examples of the power of religion in guiding human

conduct may be cited. Without an understanding of its religion, no one can comprehend the creative energy of the period.

FOR FURTHER READING

COULTON, G. G.: *The Inquisition*
CUTHBERT, FATHER: *The Romanticism of St. Francis*
DAVIS (ed.), H. W. C.: *Mediaeval England* (new ed. of Barnard's *Companion to English History*, Chap. X)
EYRE, EDWARD (ed.): *European Civilization. Its Origin and Development*, Vol. III
GUIRAUD, JEAN: *The Mediaeval Inquisition*
JARRETT, BEDE: *Life of St. Dominic*, 1170–1221
JESSOPP, AUGUSTUS: *The Coming of the Friars*
LEA, H. D.: *A History of Auricular Confession and Indulgences in the Latin Church*
MARX, W. J.: *The Development of Charity in Mediaeval Louvain*
MAYCOCK, A. L.: *The Inquisition*
MILMAN, H. H.: *History of Latin Christianity*
O'BRIEN, GEORGE: *An Essay on Mediaeval Economic Teaching*
PAULUS, NIKOLAUS: *Indulgences as a Social Factor in the Middle Ages*
SABATIER, PAUL: *Life of St. Francis of Assisi*
SPAULDING, H. S.: *Chapters in Social History*
TOUT, T. F.: *The Empire and the Papacy*
VACANDARD, ELPHÈGE: *The Inquisition*
WOOD-LEGH, K. L.: *Church Life under Edward* III
WORKMAN, H. B.: *The Evolution of the Monastic Ideal*

Chapter XXVI

MEDIEVAL REVIVAL OF LEARNING

We cannot understand the medieval mind unless we put ourselves first at the starting point of medieval society.—G. G. Coulton

THE medieval Renaissance that transformed the intellectual life of the Middle Ages was truly a rebirth of philosophy, science, medicine, and learning. Although it is difficult to assign precise causes to this or other moral and intellectual phenomena, we may point to the following factors: (1) striking economic progress in feudal days, due to reviving trade, industry, and town life; (2) active relations with the Byzantine world; and (3) the influence of Arabic civilization. Much of Greek science and philosophy revived; that which had made the Byzantine and Arabic civilizations great now helped produce the civilization of the Christian West.

The Carolingian Renaissance (see Chap. XX) by no means proved barren of results. Many a Benedictine cloister like Fulda, Moissac, and Aurillac became noted for its learning during the rough times after the disintegration of the Carolingian state. Cathedral schools also had a share in this activity. The best scholars mastered the liberal arts; in fact, basic scholarship before 1000 was contained in the trivium and quadrivium. This rather scanty learning was supplemented by the Vulgate and the Church Fathers such as St. Ambrose, St. Jerome, St. Augustine, Gregory the Great, Boethius, Isidore, Bede, and Alcuin. The works of Cicero, Ovid, Vergil, and Horace also were read.

Joannes Scotus Erigena. Joannes Scotus, surnamed Erigena, supposed to have been born in Ireland, was the most remarkable thinker of the ninth century. He joined the Palace School at the Carolingian court, mastered the learning of the day, and read Greek. The date of his birth is unknown; he died between 867 and 891. His philosophy was a thoroughgoing Neoplatonism—almost identical with pantheism. "God," he said, "is the essence of all things because he alone exists." All things emanate from God in a definite order; they may also return to him in such order. Scotus had a powerful and original intellect akin to the Greek mind, although, curiously, he knew little about Aristotle. Nevertheless, he was a link in the continuity of philosophic thinking between the Dark and Middle Ages.

GERBERT OF AURILLAC. Scholars of the Christian West began to recapture Greek and Arabic scientific learning about the year 1000. Gerbert of Aurillac in southern France was one of the first to turn his attention to the Arabic scholarship of Spain. Born about 950, he became a monk in the Benedictine monastery of Aurillac, where he mastered the trivium and learned much more about the quadrivium than was usual at the time. From a visit to Spain he acquired a deep knowledge of Arabic science and was the first Christian writer to describe Arabic (or rather Hindu) numerals. Such was his knowledge of mathematics that admirers thought he was a magician. Gerbert was also a literary man; his letters giving his views on conditions in Christian Europe are particularly interesting in that he spent his last years, from 999 to 1003, as Pope Sylvester III.

THE OTTONIAN, OR SAXON, RENAISSANCE. It was in Germany that learning made the most progress during the tenth century. The Ottonian Renaissance is so called because of the intellectual and artistic encouragement given by the German kings and emperors—Otto I, ruling from 936 to 973, Otto II from 973 to 983, and Otto III from 983 to 1002. Sometimes it is called the Saxon Renaissance, because the Ottos were members of the royal house of Saxony. The court and government of Otto I were patterned after those of Charlemagne, whose empire he revived in 962. The imperial title assumed by Charlemagne had been neglected for nearly a century owing to the stress of feudal wars. The empire seemed defunct, but Otto I was successful in reestablishing order in Germany and Italy. Imperial tradition was far from dead, and people were very willing to believe that this great ruler was a real emperor, like Charlemagne or the rulers of Byzantium. While there was no formal palace school at the court of Otto I, scholars were welcomed and learned men became bishops and abbots. The relations with Italy established by Otto I enabled churchmen to bring to Germany, a country backward in culture as compared with Italy, some of the educational ideas of Italian monastic and cathedral schools.

Bruno, younger brother of Otto I, was a characteristic product of the Ottonian Renaissance. As archbishop of Cologne (953–965), he was responsible for making the cathedral school of Cologne the chief educational center of the Rhineland. Other important schools flourished at St. Gallen, Reichenau, Hersfeld, and Fulda. Chroniclers wrote histories dealing with important events of the time, especially in Germany. Roswitha, a nun in the convent at Gandersheim, studied Terence and followed his comedies as a model in writing her own plays; his clever and lascivious dialogue is lacking, naturally, her desire being to inculcate religion. Otto III's empress was Theophano, daughter of the Byzantine emperor Romanus II. She brought with her to Germany a keen appre-

ciation of Byzantine culture. Greek artists and workmen followed her, exerting considerable influence on architecture and the art of illumination in northern Germany. Bishop Bernward of Hildesheim built the Church of St. Michael in Hildesheim after the manner of Italian basilicas. Its carved wooden ceiling reminds one of the splendid ceilings of Italian churches, and its bronze doors showing the life of Christ were the first of their kind to be cast in Germany. Bernward, also greatly impressed by the Column of Trajan, erected a similar column in Hildesheim, on which is portrayed on a spiral band the life of Christ. Thus we see how powerful an influence the artistic monuments of ancient Rome exerted upon the imagination of the tenth century. Otto III himself did much to stimulate this admiration. He thought of himself as a successor to the ancient Roman emperors, lived on the Palatine Hill, where they had lived, and tried to revive imperial Roman and Byzantine offices with high-sounding Latin names.

Intellectual Activity after 1000. Influences of the Carolingian and Ottonian renaissances radiated from Italy and Germany into every monastic and cathedral school of northern Europe. By the eleventh century, commerce revived, people traveled, and towns grew rapidly in northern Italy. A growing intellectual curiosity aroused a keen interest in the culture of the Greco-Roman world. Irnerius, for example, taught Roman law before 1100 at what was to become the University of Bologna; the fact that students flocked to his classroom shows the widespread interest in the subject.

There was also keen interest in Greek and Arabic intellectual achievements. Gerard of Cremona (*d.* 1187) was perhaps the most active of the scholars who made the nearly forgotten sciences of the Greeks known in the West. He and others translated four of the six treatises on logic contained in Aristotle's *Organon*. (The *Categories* and *On Interpretation* had been translated by Boethius.) Gerard is said to have translated over seventy works of Arabic science in addition to the supremely important *Almagest* of Ptolemy. Another scholar to study Arabic works was the Englishman Adelard of Bath, a contemporary of Gerard of Cremona. Adelard taught in Paris and Laon and was one of the first after Gerbert of Aurillac to visit Arabic Spain in order to complete his education. About 1116, he translated the works of Euclid from an Arabic original and also a work on the astrolabe. In addition, he wrote a number of mathematical treatises. The labors of Gerard of Cremona and Adelard of Bath mark an epoch in the intellectual development of the Christian West.

School at Chartres. Northern Europe, like Italy, was pulsating with energy at the opening of the twelfth century. Manors were teeming with peasant vigor, and towns were the haunts of merchants. New life

was stirring everywhere, and youths eager to learn traveled to monastic and cathedral schools. The most noted of these schools in the twelfth century was the one in the cathedral of Chartres in France. It devoted much attention to the Latin classics; its scholars studied these so carefully and wrote Latin so elegantly that in the later Italian Renaissance their compositions were mistaken for genuine works of ancient authors. One of the most remarkable scholars produced at Chartres was an Englishman named John of Salisbury (*d.* 1180), who believed that, to be called learned men, students should master the seven liberal arts, read all the Latin classics, and acquire an elegant Latin style.

St. Anselm. Among the philosophers of the eleventh century none was greater than St. Anselm (*d.* 1107), noted also for the saintly character of his life. Born in Lombardy in 1033, he went to the Benedictine monastery of Bec in Normandy and later became archbishop of Canterbury. He engaged in a famous struggle with King William II, who ruled England from 1087 to 1100, about the royal right to interfere with the internal affairs of the church.

Anselm was guided by Platonism, which he derived from St. Augustine of Hippo and Boethius. One of his philosophic arguments was a proof for the existence of God, known as the "ontological" argument. It runs as follows: We say that God is a being than which no greater being can be thought to exist. We know that in our mind we have an idea of such a being. This being must exist outside our mind or else it would not be greater than our thought of such a being. A little reflection shows that this reasoning was derived directly from Platonic speculation about Ideas. The argument interested many thinkers, but Thomas Aquinas later rejected it because he believed that we may not infer the actual existence of God from our idea of God. On the following pages we shall have something to say about Thomas Aquinas's more satisfactory proofs for the existence of God. Anselm discussed these philosophic matters in his *Monologium* and *Proslogium.* Another of his great works is the *Cur Deus homo* or *Why God Became Man,* a theological work that long guided religious thinkers.

Importance of Logic in Education. In the twelfth century, logic began to assume a leading part in education, a fact difficult for modern students to understand, because it plays so restricted a role in modern university studies. We know that it is necessary to reason correctly, that is, in accordance with the rules of logic. But we also know that reasoning, even though correct in form, will lead to erroneous results if the premises are false. To reason about cancer will never give us an understanding of the disease; we must first ascertain all possible facts about it. So long as we do not acquire such knowledge, no cure can be discovered. This principle was not evident to the students of the twelfth

century, who knew relatively little about nature. The rediscovered logic and metaphysics in Aristotle's *Organon* hypnotized them into the belief that questions about nature, life, and the universe could be solved by logical reasoning. Throughout the Middle Ages and even in modern times, more reliance has been placed upon correct reasoning than upon direct observation of nature. So long as this method is followed, progress in science is limited and many blunders are made.

The great scholars of the twelfth century subjected all questions to sharp, logical analysis. Many topics were discussed, often with acrimony. Most important and famous of these questions is the nature of *type* and the relation of the *individual* to the type to which it belongs. For example, when we see a horse or a cow, we are reasonably sure that we see a horse or a cow. But when we use the word "animal," the problem changes. We are also quite certain that our idea about "animal" is correct. The horse, cow, pig, and sheep are called "animals." We have direct experience of horse, cow, pig, and sheep through our senses. But our knowledge of "animal" is of a different nature. What is the relation of the individual horse, cow, pig, or sheep to the type to which these individual animals belong? Which is real, the individual or the type, and what is their relationship? Endless discussions took place over such questions, many of them, no doubt, futile. Nevertheless, the problem of the relation of individuals to the type to which they belong lies at the very basis of thinking and therefore of science and learning. It involves such matters as the relationship of man to society, man to church, man to state, and man to his family.

The logicians of the Middle Ages found that all things might be discussed in the light of the newly rediscovered Aristotelian books on logic. They worked out four solutions to the difficult problem of universals, of which realism is one. Some scholars argued that when men talk of "horses" the thing that is real is the type "horse," not the individual "horses" composing the type. There is, they held, a real substance "horse" beside which the individual horses are unreal or insubstantial. The reader will readily note Plato's influence in these arguments. Plato, as we recall, believed that general types or Ideas are real; they come from the world beyond our senses. The logicians of the twelfth century who adopted Plato's views were called "realists," and their doctrine was known as "realism." Their opponents, the "nominalists," saw that persons have direct experience only of individual "horses." Because this constitutes man's experience in connection with all things, they argued that only particular things exist and that types do not exist. Some of the opponents of the realists went so far as to say that types are but "empty words" or "names"—hence their name "nominalists."

ABÉLARD AND CONCEPTUALISM. Wrangling over realism and nominalism, philosophers and students for a time made no progress toward a solution of this knotty problem. Finally there appeared a logician and philosopher named Pierre Abélard (1079–1142), born in Brittany. He was but twenty when he arrived in Paris to listen to the lectures of Guillaume de Champeaux, a teacher in the school connected with the cathedral of Paris, Notre Dame. Guillaume de Champeaux was a realist of the conservative sort; Abélard was youthful, vigorous, and bold. He was born of noble parents but forsook the career of a soldier and knight to which he seemed destined. Opposing his teacher, he overwhelmed him with arguments that the realists' position was untenable. His success won him such acclaim that the young upstart proceeded to open his own school at Melun near Paris. Students from all parts crowded to hear him eloquently expound a solution of the problem over which realists and nominalists had so long been deadlocked. Starting from the nominalist position that particular things alone are real, Abélard perceived that the names of types were not empty words after all. Although he declared that only particular things exist and that types have no existence in themselves, he added that the mind forms general "concepts" which exist only in the mind. Thus, Abélard may be called a "conceptualist" and his doctrine "conceptualism." His solution marked a great advance but could not permanently satisfy all. Many saw that, if concepts exist only in our minds and have no reality in the objects we see, our thinking can have no satisfactory basis. Abélard's views were rejected by Thomas Aquinas, whose solution, known as "moderate realism," will be discussed later (pages 423 to 425).

Abélard created a deep impression on the intellectual and educational life of his day. He was fearless and disregarded authority. He produced a book called *Sic et non*, or *Yes and No*, a collection of quotations drawn from the Bible, Church Fathers, and writings of later theologians, including popes. Often these quotations were contradictory. Abélard arranged them according to topics, intending that students should discuss them by means of the logic of Aristotle. But here was the rub; in his zeal for rational explanation he seemed to infringe upon the teachings of the church. He followed reason even when it ran counter to the faith.

To the more conservative, Abélard's methods appeared disconcertingly bold. He looked at problems too much as a logician, disregarding metaphysics. Flippant and vain, he treated his opponents with disdain. He incurred the hostility of St. Bernard (1091–1153), a Cistercian monk of great piety and one of the most powerful personalities that ever lived. St. Bernard was a mystic and cared little for logic

as compared with faith. He preferred to understand God through contemplation and the practice of humility. Worldly learning, he believed, should not be sought if it did not lead to a spiritual life. He was the very opposite of Abélard and viewed the latter's audacities with horror. Abélard discussed the Trinity as a logician whereas he should have discussed this religious problem metaphysically after the manner of theologians. Consequently, his statements on the Trinity were condemned before a council at Sens in 1140. Abélard's brilliant career was marred by controversies with opponents, which are recounted in his autobiography, the *Story of My Misfortunes*. His life was further embittered by his unhappy relationship with Héloise. This poignant tragedy, which holds romantic interest even for our own day, may be traced in Abélard's autobiography and his letters to Héloise.

Scientific Progress. It should not be assumed that logic was the sole object of interest during the twelfth and thirteenth centuries Gradually, the moral and philosophic works of Aristotle became known, in spite of their literary wanderings. Written in Greek, they were translated into Arabic by the scholars of Bagdad, Damascus, and other intellectual centers of the Arabic world. Gerard of Cremona and Adelard of Bath retranslated the Arabic translations into Latin; their work contained mistakes and misconceptions since making accurate translations is a difficult task. But great improvements were made during the thirteenth century when scholars translated some of Aristotle's works directly from the original Greek into Latin. In this way, students became acquainted with Aristotle's *Politics*, *Ethics*, *Poetics*, *Rhetoric*, *On Animals*, *On the Soul*, and *Metaphysics*. A revival of learning took place of sufficient importance to be called the "twelfth-century Renaissance."

Albertus Magnus (1193–1280) was a Bavarian Dominican who mastered the new Aristotelian learning and combined it with Christian teaching into a harmonious body of doctrine. Albertus's greatest interest was science, and to that end he mastered such ancient Greek scientific knowledge as had been preserved in the works of Aristotle and Ptolemy and added much information from direct observation. He studied botany so successfully that he is regarded as the first botanist after Theophrastus. He speculated on the nature of sap and the relation of leaves, vines, buds, and flowers and described many plants that grew in Bavaria but that had not been noticed by scientists before him. He was interested in zoology and supplemented the writings of Aristotle on animals with his own observations. People of his day were in the habit of reading "bestiaries," inaccurate descriptions of animals intended to illustrate moral lessons. But Albertus Magnus was above such folklore. He critically studied insects, fish, birds, geography, elementary chemistry,

medicine, and astronomy. An active observer and something of an experimenter, he knew how to make gunpowder. "The aim of the natural sciences is not merely to accept the statements made by others but to investigate the causes which are at work in nature," he declared. Albertus Magnus also drew a careful distinction between magic and science.

THOMAS AQUINAS. Thomas Aquinas (1224–1274) was the most distinguished intellect of the medieval Renaissance. Born the son of a Neapolitan nobleman, he went to school at the famous Benedictine monastery of Monte Cassino and planned to enter the Dominican order. His parents objected to this step as they wanted him to make his family famous in political life. But the youth was determined to study and, escaping from the prison in which his family had put him to keep him from joining the Dominicans, he went to Paris and Cologne to study under Albertus Magnus. The students mistook Thomas Aquinas's modesty for incapacity and referred to him as the "dumb ox." But Albertus Magnus said, "Some day he will make so great a roar with his teaching that the whole world will resound with it."

Thomas Aquinas returned to Paris about 1252, where he spent many years studying, teaching, and writing. The greatness of Thomas Aquinas lies in that he assimilated the thought of Aristotle more fully perhaps than any other philosopher of his day or of subsequent times. Next, he harmonized Aristotelian philosophy with Christian teaching. To combine Aristotelian science and philosophy with Christian religious thought meant a secure intellectual basis for both medieval and modern culture.

Thomas Aquinas solved the difficult problem of realism and nominalism. Abélard had attempted the solution by his theory of conceptualism, namely, that concepts exist *in the mind* but not *in the objects*. According to Thomas Aquinas, however, we have knowledge of individual objects and of general things as well. So sure of these general ideas are we that we unhesitatingly base actions upon them. Thomas Aquinas decided that (1) only individual things exist, (2) universals do not exist in themselves as substances apart from the individual things, and (3) ideas formed by the mind are not mere concepts, as Abélard taught, but true representations of the general qualities, or universal, seen in individual things. Because this was a moderate way of looking at the problem, it is called "moderate realism" or "Thomistic realism."

SCHOLASTICISM. The term "Scholasticism" is usually applied to the philosophy, science, and theology of the Middle Ages, and the scholars who held to its teachings are called "schoolmen" because they taught in cathedral and monastic schools. Many books contain misconceptions about Scholasticism. The student should grasp the following points in

order to form a clear idea of the character and importance of scholastic thought. (1) In science, scholastic philosophers relied upon Aristotle, Galen, and Ptolemy. Aristotle had indeed shown by example that particular data must be discovered through observation and experiment. But experiment was not pursued energetically, at least from the standpoint of the nineteenth and twentieth centuries. Instruments had not yet been invented, and experimental science was still in its infancy. (2) Scholastic philosophy was far better developed than scholastic science. Scholasticism ranks with the greatest of philosophic systems; its logic, psychology, metaphysics, and ethics reveal profound insight. (3) Scholastic theology is based upon *faith* as well as reason. It produced a vast body of learning, which sets forth the highest aspirations of medieval thinkers.

The Dark Ages, although deeply religious, possessed no elaborate theology. It was on the recovery of Aristotle's treatises on logic that theological learning could develop rapidly. Peter the Lombard (*d.* 1160) collected the opinions of the Church Fathers on Christian teaching in his *Four Books of Sentences*. This book, which became fundamental in the study of scholastic philosophy and theology, was arranged much like Abélard's *Sic et non*. Other scholars continued the work; gradually, a vast bulk of theological lore came into being, and Thomas Aquinas made a synthesis of it all. He rejected Aristotle's doctrine that matter is eternal in favor of the Christian doctrine that it is created and further maintained that the human soul is immortal. But he successfully harmonized with Christian teaching the Aristotelian system of the earth, planets, stars, and the First Mover. Scholastic theology became the rock upon which all philosophical study of the Christian religion was based. Thomas Aquinas's theological system is contained in his *Summa theologica*, a voluminous theological encyclopedia that was used by a multitude of students and everywhere quoted as an authority.

Only a few of the teachings advanced in the *Summa theologica* can be mentioned here. Among the most interesting are Thomas Aquinas's first and fifth arguments for the existence of God. The first is the very common one that a Final Cause must be assumed as the natural order of things. It is the experience of all men that a result is preceded by a cause. The ripples on the surface of a pond are caused by a stone. The stone was thrown into the water by a boy. The boy's hand casting the stone, the muscles of his arm that give movement to the hand, and the nerves that direct the muscles are all intermediate efficient causes. This train of efficient causal agents is set in motion by the first, or final, efficient cause—the will. Thomas Aquinas, like Aristotle, argued that there could be no effect without a cause. If we have only an infinite series of efficient causes, we have no sufficient cause and it is thus neces-

sary to assume the existence of a first cause. This first cause is the Prime Mover of Aristotle; Thomas Aquinas called it God, identifying it with the Christian deity.

The fifth and last argument for the existence of God is the argument from design. Looking about him, Thomas Aquinas observed that inanimate things of the world always or nearly always act in the same way: trees always or nearly always act in a certain way, as do stones, water, the sun, and all other inanimate things. Such action cannot be fortuitous; for if it were, it would not be possible for us to form ideas and science and all thinking would be impossible. Since inanimate things lack intelligence yet act in a fixed way, they must be directed by some external being who has knowledge and intelligence. The knowing and intelligent being who gives such design of action to all inanimate things, Thomas Aquinas argued, is some force within and beyond the created universe. He identified it with the Christian God.

These arguments have engaged the attention of many. Though Thomas Aquinas's way of putting them has often been attacked, no one has disposed of them successfully. Philosophic questions have a way of recurring, and we cannot ignore them. Thomas Aquinas anticipated many of the problems that trouble modern thinkers, for he discussed the arts, sciences, and philosophy, as well as theology. His ideas formed the basis of scholastic philosophy; and because this philosophy remained the foundation of thinking from the time of Thomas Aquinas to that of Descartes (*d.* 1650) and even today is witnessing a remarkable revival, they are most impressive.

Roger Bacon. The third intellectual giant of the thirteenth century was Roger Bacon, an Englishman (1214–1292). Albertus Magnus and Thomas Aquinas drew their philosophic and scientific knowledge primarily from Aristotle, Ptolemy, and Galen. Albertus Magnus studied nature directly. Thomas Aquinas believed in this method but remained a philosopher and theologian. Roger Bacon believed that science can be pursued only by the direct observation of nature (that is, inductively) and that *authority* in science is a stumbling block. He even went so far as to denounce knowledge arrived at deductively, a stand that brought him into opposition to philosophers of his day. He was occasionally credulous and utopian, but some of the predictions in his *Opus majus*, or *Greater Work*, seem strikingly accurate in the light of recent mechanical progress.

Machines for navigation can be made without rowers so that the largest ships on rivers or seas will be moved by a single man in charge with a greater velocity than if they were full of men. Also cars can be made so that without animals they will move with unbelievable rapidity; such we opine were the scythe-bearing

chariots with which men of old fought. Also flying machines can be constructed so that a man sits in the midst of the machine revolving some engine by which artificial wings are made to beat the air like a flying bird.

Formerly, Bacon was regarded as a scientific and inventive genius and credited with having invented window panes, chimney flues, the mariner's compass, the rudder, paper, lenses, eyeglasses, gunpowder, and other objects. Bacon opposed magic as false but in the absence of rigid scientific knowledge found it difficult to draw a clear line between it and science. On the other hand, he believed confidently in astrology. An enthusiastic student of language, he boasted he had invented a simple grammar whereby one could learn Greek, Latin, Hebrew, or Arabic in a few days. There was much merit in his belief that scholars should read the Scriptures in the original Hebrew and Greek, something universally neglected in the West. His great book is the *Opus majus*. Its significance for the history of civilization consists in the picture it gives of the scientific notions that obtained in the thirteenth century. Great as he was as an original investigator and philosopher, Roger Bacon was undoubtedly inferior to Albertus Magnus.

Decline of Scholasticism. During the fourteenth and fifteenth centuries, scholastic philosophy declined. There were able Scholastics after Thomas Aquinas, as, for example, William of Ockham (*d.* about 1349). Ockham reasoned much like Abélard, holding that only individual things exist and that we form general concepts which do not exist outside our minds. This skepticism led Ockham to question the truth of general ideas. He concluded that human reason cannot arrive at certainty about such doctrines as immortality and moral law. He however believed in such principles, but solely on the authority of Christian teaching. This skeptical point of view was the beginning of the decline of moderate realism as taught by Thomas Aquinas and his followers. There always had been contentions over philosophic points; but the strife now became acrid, and little further progress was made in philosophy during the remaining Middle Ages.

Mysticism. Scholastic philosophy was sternly intellectual, and its exponents avoided mysticism in their philosophic reasoning. But in their religious thinking, which often went beyond the bounds of philosophy, some scholastic philosophers became mystics. Thomas Aquinas, for example, supremely rational as he was, became a mystic when contemplating the central points of the Christian faith. Mystics endeavored to have concrete experience of such objects of faith as grace, salvation, and the personality of God by growing into a knowledge of the supernatural. They felt their rational powers were too limited to afford them this experience; hence, they sought it through contemplation.

The great medieval mystics were strongly influenced by Neoplatonic ideas. Hugh of St. Victor (*d.* 1141), a Saxon, served as abbot of St. Victor in Paris and had numerous disciples among the Victorines. He taught that reason alone cannot penetrate to the inner truths of faith unless aided by divine help; it is well to be a philosopher, but one should join mystic contemplation to philosophic thought. Knowledge is but the first step to the mystic life, which leads to God. There are four stages in such a mystic course. In the preparative stage the soul soliloquizes and questions about God. In the second, through thinking, it tries to find God. The third stage is one of meditation, in which the soul seeks God within itself. The final stage consists in contemplation, whereby the soul is united with God in supernatural intuition. This type of mysticism flourished in Germany but also became common in other lands.

Pantheism is a philosophic tendency that identifies God the creator with the universe, his creation. Mystics regarded God as being not only *in all things* but sometimes seemed to argue that God *is all things*. The view of theologians and philosophers was that God is not only *in* all things, but he is also *above* and *beyond* all things. Pantheist teaching appeared in Paris during the thirteenth century through the influence of the Arabic philosopher Averroes of Cordova (1126–1198). He held that the individual soul is a material substance; there is no personal immortality—only a collective immortality of mankind, which possesses a single soul in view of the proposition that there is no fundamental distinction between God and his creatures. "Men die; the soul of the race is immortal." Scholastic philosophers bitterly opposed such teaching, for it ran "counter to any deep sense of human personality, by minimizing the individual aspects of thinking and of religious experience—and by eliminating personal immortality."

Disgusted with the bickerings in the universities after 1300, many serious men turned their backs upon philosophy. They felt that it is better to be charitable than to discuss the Trinity subtly and without charity, better to be contrite than merely to know how to define contrition. That person is truly learned who does God's will and renounces his own. People who held such views were opposed to the endless quibbling of philosophers; they were antischolastic. The more Scholasticism degenerated, the more such mystic attitudes gained ground. Meister Eckhart (*d.* 1327), a German who studied in Cologne and Paris and one of the most influential of the mystics, believed that as he contemplated the ways of God and man all distinction between the two disappeared. Supreme happiness resulted from unification with God, which ended in a kind of deification of man. Eckhart had followers like Johannes Tauler (*d.* 1361) and Henry Suso (*d.* 1366). There were

other mystics who remained unquestionably loyal to orthodox Christian teaching. Among them were the Netherlanders John Ruysbroek (*d.* 1381) and Gerhard Groot (*d.* 1384) and the German Thomas à Kempis (*d.* 1471), author of the famous *Imitation of Christ.* These men influenced thought during the closing Middle Ages, undermining the ancient belief in scholastic philosophy. It was not till the seventeenth century, however, that the revolt against Scholasticism was completed by the philosopher René Descartes (*d.* 1650).

Revival of Medical Study. Medical science and practice revived after long dormancy during the Dark Ages. True, some of the scientific knowledge of men like Galen had been handed down from one generation to the next, but it had become more and more debased. Ancient leechcrafts were used among the Celts, Germans, and other peoples. Some of the superior knowledge and skill that Arabic medical practitioners had inherited from the Greeks, however, entered the West by way of Salerno, the first beginnings of the revival of Greek medical science. It is not possible to state when the school at Salerno was established, but it became famous during the eleventh century. The most noted personality connected with it was Constantinus Africanus (*d.* 1087), born in Carthage, who had traveled in Arabic lands and become acquainted with Arabic medicine. He lived in Salerno and spent the last years of his life at the Benedictine monastery of Monte Cassino, where he translated books written by Arabic physicians. One of them was the *Pantegni*, or *The Complete Art*, a medical encyclopedia by Ali Abbas. This and other works were received with much favor by the teachers of Salerno and their pupils.

Until the eleventh century the study of human anatomy remained unknown in the West. Prospective physicians at Salerno had been instructed by dissecting pigs. In the absence of human anatomy, such practice was useful in the illustration of medical ideas but was otherwise defective, for successful medicine is based upon a complete knowledge of the anatomy and physiology of the human body. Constantinus Africanus emphasized the need of dissection and probably contributed to the revival of the study of human anatomy. Bedside medicine also improved. Physicians learned to examine urine, count the pulse, classify fevers, and make chemical notes. Medicines derived from ancient pharmacopoeias became better known. Diseases of the eye were treated more scientifically, and midwifery improved.

In this way, Salerno played a leading role in scientific medicine during the eleventh and twelfth centuries. The fame of the university was finally eclipsed by Bologna and Montpellier. Human anatomy definitely superseded pig anatomy. Scholars drew more fully upon Arabic medicine, and the complete recovery of ancient medical science became

possible. Two great masters of medieval medicine were Arnaldus Villanovanus (*d.* 1311) and Guy de Chauliac (*d.* 1380). The latter wrote a manual, the *Great Chirurgery*, which was widely used until the seventeenth century.

Revival of Roman Law. The study of law was another aspect of the intellectual revival of the twelfth century. The rapid growth of population as shown by the rise of towns created a new interest in law. So long as men made their living from agriculture, the simple customs of the manor sufficed to regulate their daily relations. But when population grew, old customs proved inadequate. To create a new law is difficult; but luckily for the men of the eleventh and twelfth centuries this was not necessary. The memory of the ancient Roman law codified by Justinian was not dead. Here and there, notaries who served as secretaries or advisers to princes and bishops and drew up legal documents knew a little about Roman law. As kings, princes, and churchmen needed trained men, lawyers were appointed to administrative posts in church and secular government. Teachers were in demand, and the lawyer Irnerius, a teacher in the schools of Bologna, became famous before the close of the eleventh century. Students came in crowds to this and other universities, and soon many were studying law.

Canon Law. Canon law, which regulated ecclesiastical activities, came into existence during the twelfth century. In 1142, a monk named Gratian who was influenced by his study of Roman law brought together a large number of rules and principles gathered from the sayings of churchmen, the Bible, and the decisions of church councils. Gratian's purpose was to provide a manual to help churchmen in settling cases and administering the many-sided business of the church. This new book, called the *Concordance of Contradictory Canons*, became popular; popes added to it from time to time. Because knowledge of canon law was a sure means of securing appointment to a clerical post, it was eagerly studied. Bologna won renown for its lectures on canon law, and Paris soon became an important rival.

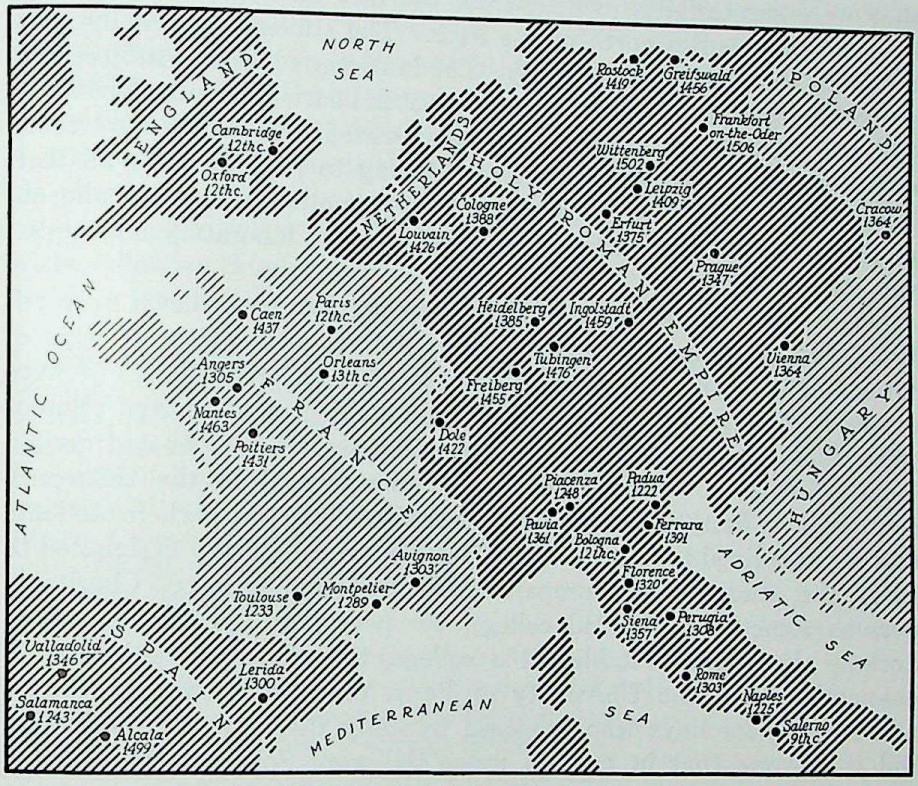
Astrology and Alchemy. Astrology and alchemy—important studies during the closing days of the Roman Empire—were eagerly cultivated by Arabic scholars and transmitted to the West. Alchemy had many devotees, and all scientists were interested in it. The noted physicians Arnaldus Villanovanus (1225–1311) and Raymond Lully (1232–1316) combined it with medicine. Because of its close connection with medicine and science, or "natural philosophy" as science was called, there were no professors who taught only alchemy. There were, however, professors of astrology at the University of Bologna. They were required to give free opinions to students. This no doubt had its use in indicating to students their probable success in life after leaving the university!

THE UNIVERSITIES. By 1200 the rediscovery of Greek science and philosophy and the revival of Roman law had revolutionized learning and education. Formerly, education had been comprised by the liberal arts, the trivium and quadrivium. Now the liberal arts became preparatory studies, to be followed by philosophy, theology, law, or medicine as the student might choose. Further, the economic progress of the eleventh and twelfth centuries had made it possible for youths to go to school. These two facts account for the rise of universities, so important in the history of civilization. A study of the universities should start with the monastic and cathedral schools created in Carolingian days. The cathedral school at Chartres flourished during the lifetime of Abélard. Its emphasis upon literature proved unpopular when the craze for the study of logic developed. Why should one spend years reading the Latin classics when logic promised to unlock all secrets? One should proceed without delay to master logic, not waste days on the details of literature. Students deserted the school at Chartres and crowded to Paris in order to hear Abélard. This was the beginning of the University of Paris.

What constituted a university? It was a new creation for the purpose of teaching. Nothing exactly like it had existed in the Greco-Roman world. The word "university" is derived from the Latin *universitas*, or corporation. Guilds, synagogues, and cathedral chapters were commonly called universities. A group of teachers might also be called a university. The word *studium* was used at first; in Italian, *studio* still means "university." Later in the Middle Ages, the word *universitas* became common, and this is the reason why we today have the word "university." The organization of universities was patterned after that of the guilds. Teachers and students formed a kind of trade, the craft of learning. Students were "apprentices" learning the craft of teaching. Teachers were the "masters" of the craft; they determined the fitness of a student who wished to become a master. After the student had studied for some time and before he became a master, he took examinations; if he passed, he became a "bachelor." He then began to teach; this was the journeyman's stage. Finally, after further study and more examinations, he was admitted to the group of masters. Such was the organization for teaching the liberal arts at the University of Paris, which was followed by Oxford, Cambridge, Prague, Vienna, Heidelberg, Louvain, and all other universities of northern Europe.

Other subjects besides the liberal arts were taught at the studium in Paris. Law, medicine, and theology became important. The professors teaching these subjects were grouped into "faculties." The faculty of the liberal arts was the largest because these subjects prepared students for the other faculties. A student was said to study "in the faculty of

theology," or "in the faculty of medicine," a usage still common in European universities. The faculty of the liberal arts in Paris was numerous. The masters and students were divided into "nations," as follows: (1) the Normans and English, who included the Germans; (2) the Picards, who comprised the masters and students from northeastern France and the Low Countries; and (3) the French, who included the rest of the French and the Italians and Spaniards. The faculties of



MAP XXVI.—The chief medieval universities.

medicine, law, and theology each had a dean, that of the liberal arts a rector, who was the head of the university.

Instruction was given by a system of reading. Since books were few and costly—they had to be copied by hand—professors read from them, adding such comments as they saw fit. These were "lectures," a word that means "reading" and is well preserved in the modern French *leçon*. The German word *Vorlesung* and our "lecture" carry the same idea. Students listened to lectures and remembered as much of the discussions as possible. When a student was ready for his final examination, he prepared a set of propositions, or "theses," which he was required to defend against all opponents. This is the origin of our theses and

also marks the beginning of our doctor's examination. The successful candidate became a "master" if he studied in the liberal arts, a "doctor" if in any of the other faculties. We still have the degrees of master of arts, doctor of medicine, doctor of civil law, doctor of canon law, doctor of theology, and others. Admitted to the guild of masters or doctors, the student became a "professor," a word that simply means "teacher."

Such were the methods employed at the University of Paris. That they were successful is evident from the fact that they were adopted by most universities north of the Alps. The student learned by practicing his craft—that of teaching. The best way to learn a subject is to prepare to teach it. A great improvement in instruction came during the fifteenth century, when printing was invented. Books became cheap and students read them instead of listening to professors for all their information. This had excellent results. Another change in the old methods was effected when, in the past century, laboratory instruction was introduced.

Colleges. Colleges were institutions peculiar to medieval universities. The studium, or university, was not an ideal place for boys of fifteen or sixteen. Because no one watched over them, they were exposed to many temptations; carousing, gaming, fighting, and idleness were common. Also, many students were desperately poor and needed help. For these reasons, "colleges" were formed in the thirteenth century. At first, these were little more than dormitories where students and masters lived together. Later, masters were specially designated to tutor the students and prepare them for examinations. Charitable persons sometimes founded colleges for poor boys. Thus Robert de Sorbon about 1257 established a college, the House of Sorbonne, in connection with the University of Paris, that was to provide board and lodging for boys who proposed to study theology. So important did it become that in modern usage the word Sorbonne has become equivalent to the University of Paris. It was in England, however, that the institution of colleges became most important. Today, at Oxford and Cambridge, most of the instruction is given by tutors of colleges.

University of Bologna. A very different type of university grew up at Bologna and was widely copied in Italy. The masters at the University of Paris constituted the studium, or university; but at Bologna the doctors formed the studium, the students the university. This peculiarity is explained by the following facts: Students in Bologna were more mature than those in Paris, having finished their studies in the liberal arts so that they were sufficiently advanced to study law. Being strangers, they organized a "university" for mutual assistance. This university of students elected rectors and regulated matters pertaining to board, lodging, fees payable to professors, and the price of books

They even regulated the conditions under which the professors were to lecture. The professors formed the studium, gave examinations, and accepted candidates for the doctorate. Bologna was famous for its instruction in canon and civil law, and the liberal arts, theology, and medicine were also taught.

Inspired by the spirit of Christianity, medieval learning in numberless ways betrayed its influence in every branch of activity. As a philosophic system, Scholasticism accepted the facts of Christian experience as well as classical scientific thought and other intellectual endeavor. Philosophers like Thomas Aquinas held that a truth in religion cannot be discredited by truths in science or in philosophy. All thought therefore served the common purpose of truth. So potent was this principle that every activity of medieval life possessed a definite unity. Without grasping this point, no one can comprehend the architecture, sculpture, painting, and music of the Middle Ages, to which we turn our attention in the following chapter.

FOR FURTHER READING

CAMPBELL, DONALD: *Arabian Science and Its Influence on the Middle Ages*, Vol. I
CUMSTON, C. G.: *Introduction to the History of Medicine*
DE WULF, MAURICE: *Philosophy and Civilization in the Middle Ages*
GILSON, ETIENNE: *The Spirit of Mediaeval Philosophy*
———: *The Unity of Philosophical Experience*
GRABMANN, MARTIN: *Thomas Aquinas, His Personality and Thought*
HASKINS, CHARLES: *The Renaissance of the Twelfth Century*
———: *The Rise of the Universities*
HITTI, P. K.: *History of the Arabs*
MCCABE, JOSEPH: *Peter Abelard*
MORISON, J. A. C.: *The Life and Times of Saint Bernard*
NORTON, A. O.: *Readings in the History of Education: Mediaeval*
O'LEARY, DELACY: *Arabic Thought and Its Place in History*
RASHDALL, HASTINGS: *Medieval Universities* (rev. ed.), Vol. I
RIESMAN, DAVID: *The Story of Medicine in the Middle Ages*
SCHWERTNER, T. M.: *St. Albert the Great*
TAYLOR, H. O.: *The Mediaeval Mind*
THORNDIKE, LYNN: *History of Magic and Experimental Science*
WALSH, J. J.: *High Points of Medieval Culture*
WEBB, C. J.: *John of Salisbury*

Chapter XXVII

MEDIEVAL ART

Architecture is the chief of the arts; for this reason periods in the history of art are named after the periods in the history of architecture.—Ferdinand Pijper

THE development of art is of the utmost importance to the student of civilization. Because of the practical need for buildings, a great variety of structures has been erected in all ages. During medieval times, houses, barns, bridges, town walls and gates, castles, hospitals, monasteries, and churches were constructed; and the study of such buildings leads to an understanding of the practical and religious life of the Middle Ages. Since architecture, together with painting and sculpture, appeals to deeper emotions and thoughts than exclusively aesthetic appreciation, religion, which deals with such questions as man's nature, purpose, and destiny, is likely to play a preponderant part in every great age of art. Moreover, art embraces nearly all man's activities. Hence, gardening is an art with an extensive history. The same is true of the theater, city planning, bookbinding, printing, dancing, weaving and the making of costumes, jewelry, pottery, and porcelain. In our modern industrial society we have many truly artistic productions. Some of our machines, the automobile, for example, have artistic value. To study these arts would require more time and energy than is at the disposal of any one person. For this reason in this chapter we limit our study to a few topics—architecture, painting, sculpture, and music.

Architecture from 313 to 1000. The story of medieval church architecture begins in 313, when Christianity became a legal religion. Freed from persecution, Christians began to build basilicas, a special form of which appeared in Greek parts of the Roman Empire. The finest example of the Greek, or Byzantine, basilica is the magnificent Church of St. Sophia in Constantinople. The Byzantine style spread to Mohammedan lands. The architecture of mosques was deeply influenced by it, that of Omar in Jerusalem being an especially outstanding example of this. The Byzantine architectural style also passed to Slavic lands, which received Christianity from Constantinople. Russian, Bulgarian, Rumanian, and South Slavic architects borrowed many features from the Byzantine basilicas. Domed churches also were

erected in Sicily and southern Italy, which had long remained under Byzantine rule.

A modified form of the Byzantine basilica appeared in the round churches, particularly that of San Vitale at Ravenna in northern Italy. This type of building was derived from such Roman churches as Santa Costanza, built during the fifth century. The church of San Vitale has an inner octagon 50 feet in diameter enclosed by an outer octagon 110 feet in diameter. A dome constructed over the inner octagon rests on eight columns. Built during the reign of Justinian (527–565), this church was used by Charlemagne (*d.* 814) as the model for his chapel at Aix-la-Chapelle, the inner octagon of which is formed by eight columns and measures over forty-seven feet in diameter. Intended to be the mausoleum of Charlemagne, this later became the chapel where the kings of Germany were crowned. Round churches were constructed from time to time during the later Middle Ages. For example, there is an interesting round church built by the Templars on the north bank of the Thames in London. But the rectangular form was preferred, and so the great Romanesque churches constructed after the year 1000 rarely were circular in form.

Art in the Dark Ages. During the Dark Ages, no distinct style of art evolved in western Europe. The decline of Roman culture discouraged new construction and original artistic effort. Furthermore, the predominantly agricultural economy of the population of western Europe could not support ambitious architectural projects. The so-called "barbarians," whether German, Slav, or Finno-Ugrian, at best could do little more than imitate the declining art of the Roman West, with the result that few striking objects have come down to us from those days. Charlemagne's chapel at Aix-la-Chapelle is one of the more remarkable exceptions. The churches of the Visigoths and other Germanic peoples were more or less rude copies of basilicas. The Irish monks built plain but original churches that owed little to old Roman types. Sculpture was almost nonexistent. Painting flourished, however, in Celtic monasteries, where the monks lovingly embellished manuscripts with a strikingly original style of illumination. Not until the disorders of the Feudal Period (850–1000) were over was new artistic effort on a vast scale possible.

Romanesque Period. The term Romanesque covers the art of western Europe from about 1000 to 1200. Social and economic conditions improved during the tenth century so that by the opening of the eleventh a veritable revival of artistic activity began. The churches erected in the new style all over western Europe remind one of the splendid basilicas constructed in Rome during the fourth, fifth, and sixth centuries; hence, the new style was called "Romanesque." Churches built in the

Romanesque manner were rectangular, possessing a nave with two or four aisles, single or double transepts, one or more apses, a narthex, and often an atrium. The arches were round, constructed on the arc of a half circle. The columns were also round, surmounted by capitals supporting arches on which rested the masonry carrying roofs of stone or

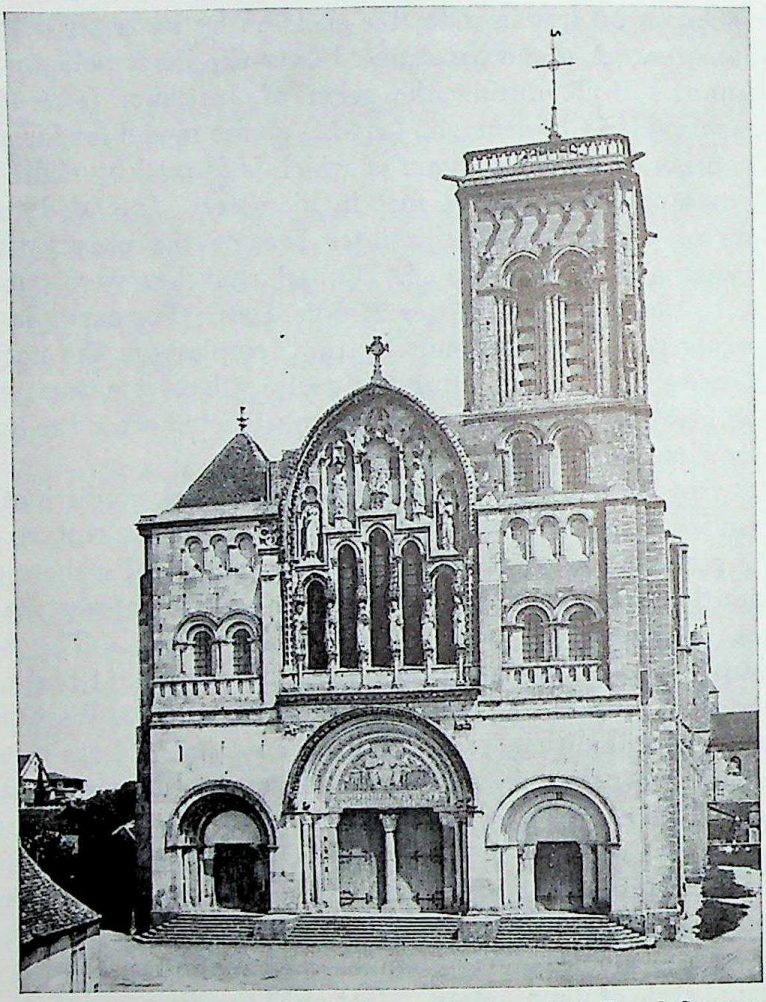


FIG. 62.—Romanesque abbey church, Vézelay. (*Courtesy of the French Government Tourist Bureau.*)

timber. Sculpture revived, and artists decorated the large amount of flat wall space with pictures.

Not long ago, it was the custom to pay little attention to Romanesque architecture. It was thought that Gothic architecture was the only form of medieval art worth studying. Today, however, Romanesque architecture is better understood; we recognize in it a remarkable artistic culture. But to understand even the simplest rudiments of architecture

one must know how buildings were constructed. Because the wooden roofs of early Romanesque churches constituted a fire hazard, it became desirable to construct roofs of stone. Such roofs, or vaults, were erected over naves, aisles, and transepts. In small buildings a continuous vault of stone was constructed on the arc of a half circle. This, the simplest kind of vaulting, is called a "barrel" vault. The stones were carefully fitted together so as to form an arch whose springers rested on the masonry of the walls. Such barrel vaults were heavy; to carry this immense burden, walls were made massive. Windows were small, for large ones endangered the stability of wall and roof. Romanesque buildings, at the beginning of the period at least, were likely to be small, low, and dark. Gradually, architects built bigger and finer churches entirely of stone, making them fireproof and large enough to accommodate great numbers of worshipers.

One of the most noteworthy of Romanesque churches is the cathedral of Pisa, which was completed by 1093. Its double aisles are covered with a stone vaulting. A flat wooden ceiling covers the nave. A low dome surmounts the crossing where nave and transept meet. The nave is flanked by two rows of thirty-four columns each, from which spring round arches bearing the heavy masses of masonry that support the central roof. A circular campanile, or bell tower, standing behind the church, is decorated with superimposed rows of columns surmounted by round arches. This structure has sagged so that in modern times it has become known as the "leaning tower." These buildings were much admired and had a marked influence on the history of Romanesque architecture.

Another remarkable Romanesque church was the abbey church of Cluny. Consecrated in 1131, it became influential in every sense; for the Cluniac congregation comprised an extensive group of monasteries promoting much that was new and fine in culture, Romanesque architecture being one aspect. It was a very large church; in addition to the nave, double aisles, double transepts, and ambulatory around the choir and apse, it had a spacious atrium. Over the main crossing rose a quadrangular tower. The vaulting was cylindrical.

Gothic Architecture. The term "Gothic" applies to the art—architecture, sculpture, and painting—of the last three centuries of the Middle Ages. This name was originated by writers at the close of the Middle Ages who disliked medieval and preferred Greco-Roman culture and, not knowing the facts, thought that the barbarian Goths destroyed classical art and created the "barbarous Gothic." Today we know that Gothic architecture was neither Gothic nor barbarous. Gothic architecture was created by the genius of the Middle Ages. As a style in art, it compares favorably with any. Some critics would place it on a higher

plane of excellence than Greek architecture. Such questions are impossible to settle because they deal with matters of taste. But it is true that Gothic architecture is one of the noblest artistic creations of man.

Gothic architecture, then, grew out of the Romanesque. The chief difference between the two was that the former employed the pointed arch while the latter employed the round arch. The pointed arch possesses an advantage over the round arch. Architects found that a pointed arch, no matter how wide apart the walls are placed, exerts less

FIG. 63.—Early Gothic vaulting, Abbey of Middelburg. (*Courtesy of the Netherlands Railways.*)

lateral thrust than the round arch. Further, it was discovered that because the round arch is constructed in the arc of a half circle the roof always bears a fixed relation to the distance between the walls. Thus, if these are placed 30 feet apart, the radius of the roof's arc is 15 feet. Hence, the wider the building, the higher the roof. Such roofs become too heavy. Architects learned that by employing a pointed arch it is not necessary to raise the roof more than is practicable. The pointed Gothic arch not only lessens the lateral thrust but lightens the weight of the roof.

The perfected use of ribbed vaulting was another feature of Gothic architecture. Ribbed vaulting was not new, for some Romanesque

structures had used this device. Romanesque architects had divided the nave and aisles into rectangular bays at each corner of which was a round column or pilaster. Transverse, diagonal, and longitudinal ribs sprang from the capitals, thus providing a frame to support the roof. This vaulting was developed to perfection in Gothic structures. It enabled architects to concentrate the weight of a stone roof so that it rested only on certain points of the walls, that is, on columns or pilasters. The space between might be devoted to windows. Later Romanesque and Gothic churches had wide windows in the clerestory and in the side walls of aisles.

Use of ribbed vaulting, the pointed arch, bays, columns, and pilasters permitted raising the roofs of Gothic churches to unusual heights. In early Romanesque churches this would have been impossible, but in Gothic structures it was a simple matter. It was necessary merely to construct solid foundations to support the ribs and vaulting above. Such lateral thrust as the pointed arch exerted upon the wall was neutralized by flying buttresses. These display much engineering skill and understanding; during the six or seven centuries that have elapsed since their construction, they have remained in perfect condition. The high roofs increased the height of the clerestory. In Romanesque churches the walls had supported the roof; large windows were impossible. But when the burden of the roof rested on columns, spacious windows were placed in each of the bays, thus flooding the nave with light.

Gothic architecture first evolved in central France in the regions around Paris. The Benedictine abbey church of St.-Denis north of Paris was one of the first large Gothic churches. Nevertheless, it had round arches in the façade. Buildings that have both Romanesque and Gothic features are said to belong to the early, or transitional, stage of Gothic architecture. Many cathedrals like those of Chartres, Noyon, Sens, and Senlis belong to this early period, which came to an end about the year 1200. The thirteenth century marks the finest and highest development of Gothic architecture, the reign of King Louis IX (1226–1270) witnessing the construction of such masterpieces as the cathedrals of Reims, Beauvais, Paris, and Amiens. During this reign also was built the superb Sainte Chapelle, which stands opposite Notre Dame in Paris. Originally built to serve as a chapel of the royal household and provide a safe resting place for the crown of thorns said to have been worn by Christ on the Cross, this little church embodies all the ideas and ideals of classic Gothic construction.

Although Gothic architecture was created in the region around Paris, we must not assume that it was exclusively "French." Rather it was Christian, a product of the medieval creative spirit impregnated with the Christian faith. Just as this faith was universally held throughout western Europe, these forms of church construction penetrated all western

Europe. The Cistercian order was one of the chief agencies of its diffusion, much as the Cluniac congregations had carried the splendors of the Romanesque style to every country. This diffusion of Gothic architecture produced many divergences so that Gothic churches in every country are likely to have unique features. Each Gothic church, town hall, and private house expressed a peculiar individuality; there was

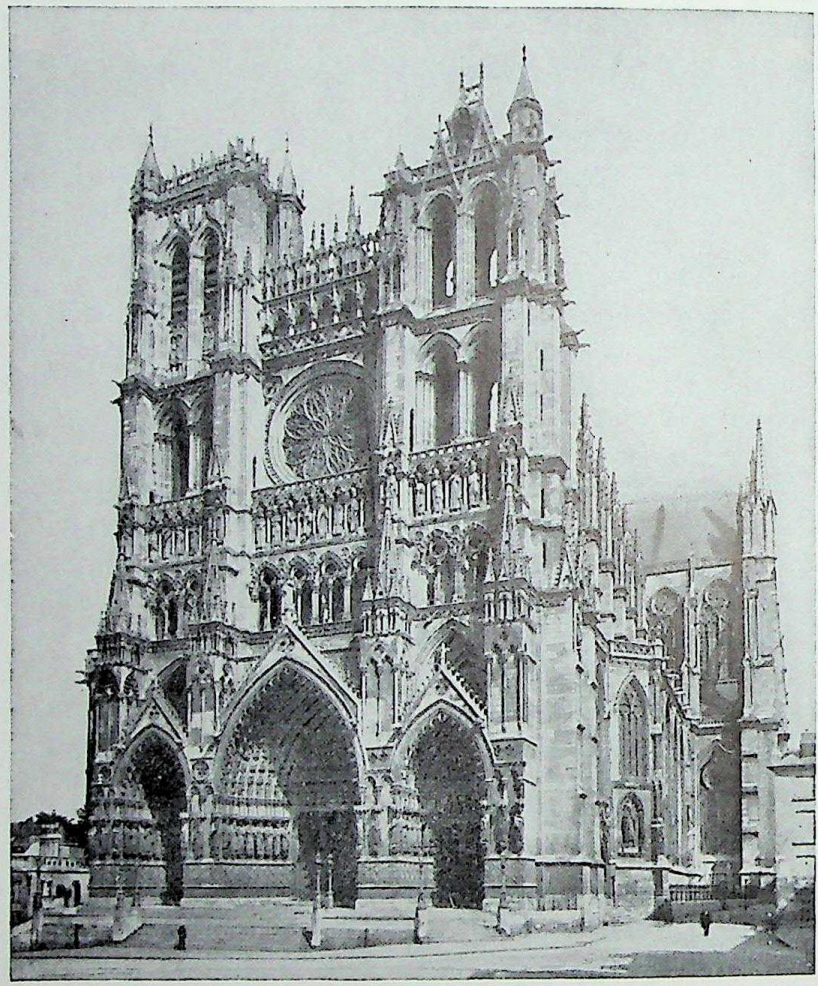


FIG. 64.—Cathedral of Amiens: façade. (*Courtesy of the French Information Center, Inc.*)

none of the monotonous uniformity we so often see in modern buildings produced by mass methods. English Gothic churches usually stand free of other structures, surrounded by pleasing lawns. Another feature of English churches is the graceful spire that soars upward from the crossing, as in the case of the cathedral of Salisbury. English Gothic is also noted for its massive towers, which form a pleasing feature of the façade. Flemish and other Netherlandish Gothic churches as a

rule were built of brick. Though less bold than buildings constructed of limestone, such churches are appealing. Italian Gothic is interesting because of its superabundant decoration, as in the cathedral of Milan. In Spain, Gothic ideas merged with Moorish conceptions, producing a peculiar variation of Gothic architecture. German Gothic followed

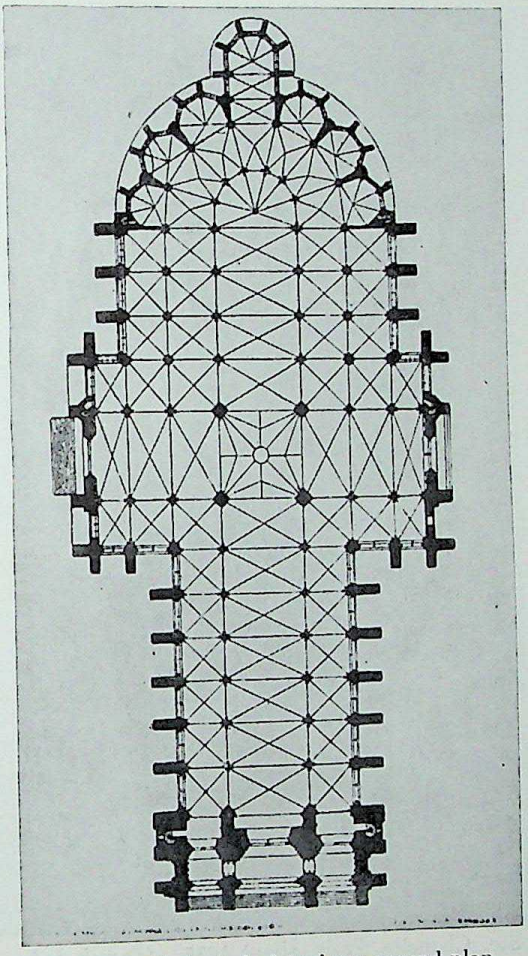


FIG. 65.—Cathedral of Amiens: ground plan.

French ideas closely, the cathedral of Strasbourg being a good example. The cathedral of Cologne also illustrates French influence, but this great church, begun in the fourteenth century, was not completed until after 1870.

Although much has been said of the magnificence of Gothic churches, little attention has been given to town halls, town walls and gates, castles, and private houses, also built in the Gothic manner. This is unfortunate because it keeps us from comprehending how universal Gothic construc-

tion really was. The town halls of Flanders are imposing creations; those of Ypres and Bruges can never be forgotten. Gothic castles like the one in the center of Ghent are equally striking. That of the doges of Venice is uniquely Venetian. Private citizens often built fine houses in the Gothic style, many of which are still occupied today. Bruges is fortunate

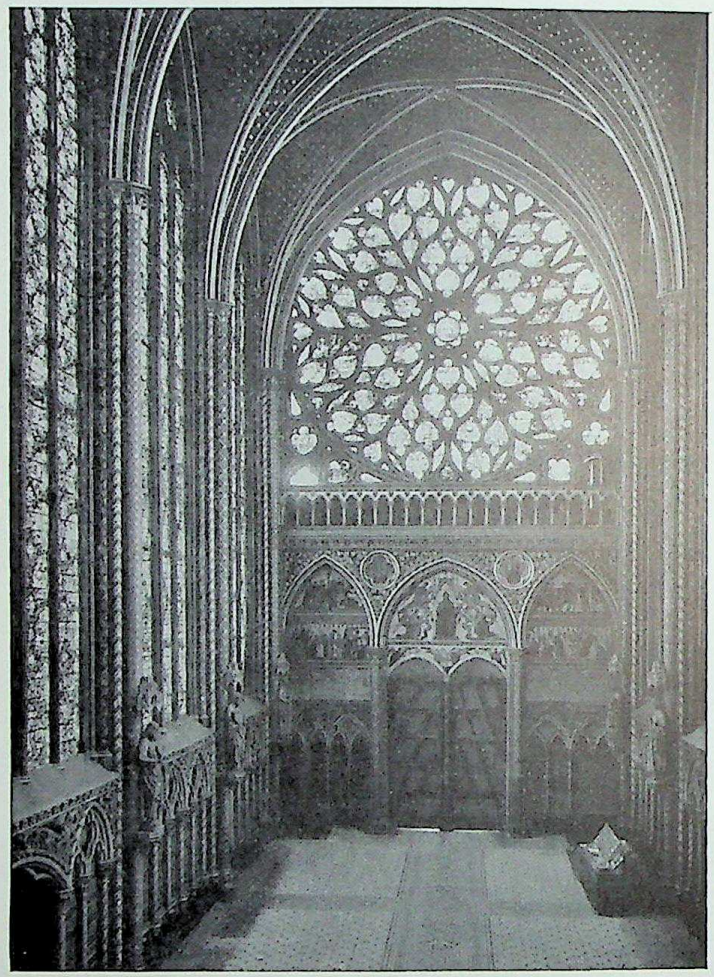


FIG. 66.—Nave of Ste. Chapelle, Paris, about 1275. (*French Information Center, New York.*)

in having whole streets lined with them. Especially famed is the house in Bourges in France built by Jacques Coeur. To understand Gothic architecture, the student must study the medieval art of every country of western Europe.

GOTHIC DECORATIVE ARTS. Gothic ideas were also applied to the decorative arts of sculpture, painting, and illumination and to every other craft including that of the smith. These arts had a twofold function, to give a pleasing decoration and to instruct. Many decorative

motifs were borrowed from Christian teaching. The church had long employed images of God the Father, Christ, the Blessed Virgin, saints, and angels. Such figures, regarded as stimulating the spirit of religion and teaching Christian truths, were presented in fixed forms that varied little from century to century. Everybody recognized such scenes as the Nativity, Crucifixion, Resurrection, and Ascension. The saints, portrayed in great numbers, were known by their special symbols. Thus Mary Magdalene carried a jar of ointment and was shown with flowing hair. St. Peter bore two keys; St. Stephen, a stone; St. Paul held a sword, the symbol of his martyrdom; St. Denis, who was popular in France and had been executed for his faith, carried his head in his hands. Since these symbols were regularly employed, whether carved from stone or used in illuminated manuscripts, no one can grasp the meaning of medieval sculpture and painting who does not comprehend their religious significance.

MEDIEVAL SCULPTURE: ROMANESQUE AND GOTHIC. Sculptured scenes from the life of Christ and figures of the saints were prominently placed in the churches. Vast representations of the Resurrection, the Last Judgment, the life of Christ, Christ in glory surrounded by his apostles, and many other scenes were carved on the great portal over the entrance. During Romanesque times—before 1150—these figures were not lifelike. Artists did not use living models but carved from memory or from other examples. For this reason, Romanesque sculpture was traditional, not naturalistic. Gothic sculptors, however, were careful to study figures naturalistically and rendered proportions, features, and muscles with the greatest fidelity. Purely decorative Gothic ornament was inspired by flowers, plants, birds, insects, and animals of the near-by countryside. As an expression of nature, the work of Gothic masters has rarely been surpassed.

A characteristic stiffness pervades Gothic sculptures; this misleads observers, yet the explanation is simple. Sculptured forms were employed to decorate churches in which the predominant lines were vertical. Figures were placed in niches and on piers and, to make them harmonize with their surroundings, vertical lines were emphasized. For this reason the statues of Christ, the Blessed Virgin, and the saints are peculiarly pleasing and impressive. More naturalistic representation of the garments would have produced an unpleasing, weak effect. Facial rendering was nearly always gracious and natural. Any other kind of sculpture would have been unsatisfactory and out of harmony in Gothic churches.

MEDIEVAL PAINTING. Flat wall spaces were decorated with frescoes—pictures painted with colored limewater applied to wet plaster, according to a carbon sketched beforehand, and showing religious scenes and figures

of the saints. The colored water permeates the wet plaster, and as the wall dries the picture becomes an integral part of it, as indestructible as the building itself. So long as the fresco is kept dry, it retains its original brilliancy.

The best form of painting before 1300, however, is the miniaturist's art. Manuscripts, copied in great number, were profusely decorated.

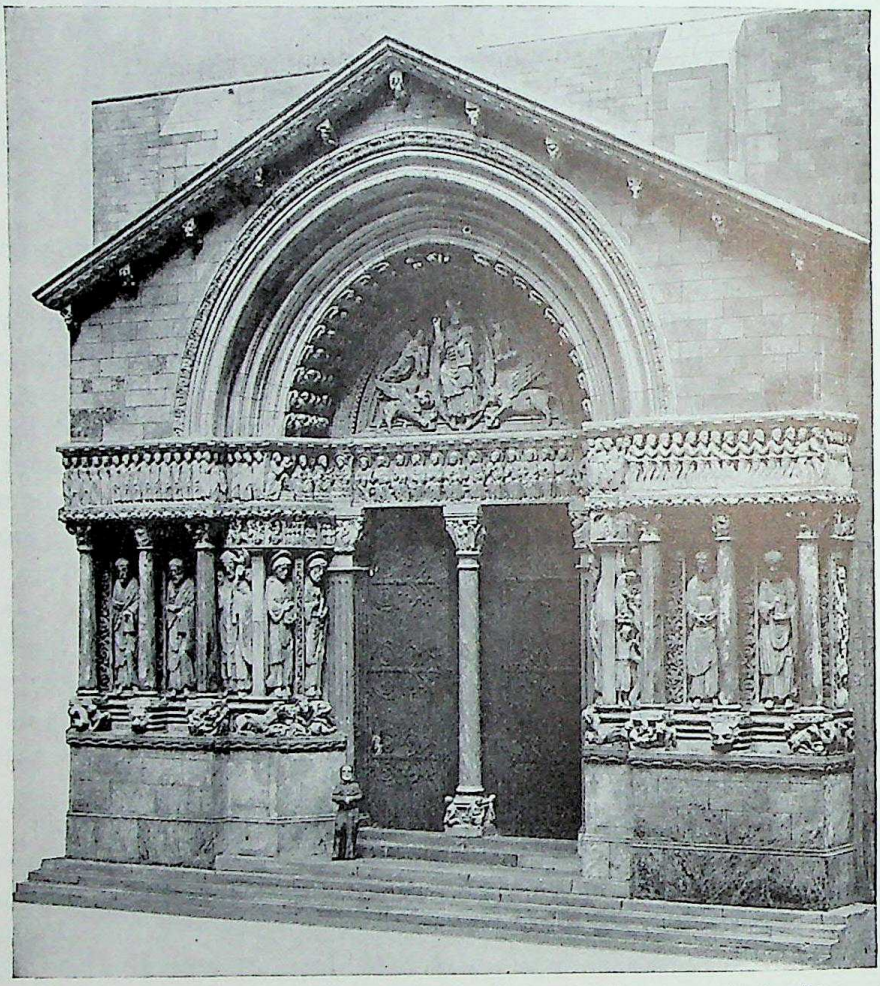


FIG. 67.—West door of St. Trophime, Arles, France. (*Courtesy of the Metropolitan Museum of Art.*)

Irish miniaturists provided the most elaborate and complicated illustrations for the books of the monks, one of the most famous of which is the Book of Kells dating from about the year 800. At first, artists employed red ink (Latin, *minium*) exclusively, and hence they were called "miniaturists"; because their pictures were not large, small pictures later were called "miniature." Other colors were used after 1200. Gothic

miniaturists painted birds, animals, insects, vines, trees, fruits, and leaves in naturalistic effects. Gold leaf also was plentifully used. The miniaturist's art reached the highest perfection during the Gothic period.

Italian Painting. Because Gothic art was a product of northern Europe, its influence in Italy lagged. Italian artists clung to older methods and conceptions called "Greek" or "Byzantine." Artists who employed "Greek" methods achieved striking effects by the use of gold and vivid color. They rarely studied original models but preferred to paint them as they had been painted by previous masters—from memory and with slight knowledge of anatomy. Pictures were painted in two dimensions only—length and width—the third dimension being ignored. The pleasing naturalism of Gothic art, learned from studying flowers, plants, and animals, was conspicuously absent. Not possessing the requisite knowledge of anatomy, Italian artists could not make drapery fall in convincingly natural folds, figures were still, unreal, without action. In other words, painting was traditional, not naturalistic.

The first artists to display a change in attitude toward composition, anatomy, action, light, and shade were Cimabue (*d.* 1302?) and his pupil Giotto (*d.* 1336). They were Florentines, and it was due to their energy that Florence took the lead in creating the new Italian Gothic painting, sculpture, and architecture. Cimabue, whose career is wrapped in obscurity, had some contemporary reputation as a painter; Dante in the *Divine Comedy* refers to the excellence of his work. His paintings may still be seen in the church of St. Francis in Assisi. Giotto served an apprenticeship under him and thus early acquired that tendency toward naturalism for which he became famous. Cimabue painted figures and scenes with a certain naturalism and vividness that Giotto improved upon when executing the scenes from the life of St. Francis, also in the church of St. Francis of Assisi.

It is well to grasp the significance of this theme. Assisi is in Umbria, the birthplace of St. Francis and the community in which he renounced the world and spent his years. The saint's life and deeds deeply impressed the imagination of contemporaries. Giotto tried to paint St. Francis' life as it must have been when he moved about the cities and villages of Umbria. These pictures were not to be painted like biblical scenes or the traditional sufferings of the martyrs. The personality of St. Francis required a more naturalistic method of representation. Giotto's frescoes of St. Francis, twenty-eight in number, therefore mark a revolution in the history of art in respect to their naturalism. They might well be reproduced to illustrate an edition of the *Little Flowers of St. Francis,* a book containing stories about the saint

as told by his followers. Two of the more famous scenes are "St. Francis Preaching to the Birds" and "St. Francis Renouncing His Father."

Giotto's greatest work, however, is in the Arena Chapel of the cathedral of Padua and in the Bardi Chapel of the Church of Santa Croce in Florence. On the walls of the Arena Chapel he painted a series of

FIG. 68.—"Madonna and Child," Amiens Cathedral. (*Courtesy of the French Information Center, Inc.*)

frescoes showing the lives of the Blessed Virgin and of Jesus. They are an advance over the scenes of the life of St. Francis in the church at Assisi, for, less influenced by tradition, his figures now have more motion, more balance in composition, and greater dramatic unity. One of the most noteworthy is the "Lamentation over the Body of Christ." The frescoes in the Bardi Chapel are even more successful. Few works of

Giotto display greater skill than the "Death of St. Francis," there. In these and later pictures, Giotto showed himself one of the greatest innovators in the history of European painting, breaking almost completely with the conventionalism of previous centuries.

Artists who came after Giotto could not comprehend the difficulties of painting as Giotto saw them. At most, they approximated Giotto's

FIG. 69.—"St. Francis blessing the sparrows," by Giotto. (*Italian Tourist Information Office, New York.*)

skill but rarely equaled it and never surpassed it. For an entire century, they failed to create anything new, and hence the fourteenth century—so far as painting in Italy is concerned—is dominated by a group that had broken with "Greek" methods but merely imitated Giotto.

ITALIAN SCULPTURE. Sculpture, like painting, passed through astounding changes during the fourteenth century. Old methods and ideas prevailing in the thirteenth century were abandoned. Before 1300,

sculptured figures made by "Greek" artists were stiff and lacked the grace of simple human form. However, some Italian artists were schooled in the methods of Gothic sculptors in northern Europe. Niccola and Giovanni Pisano, father and son, carved many panels for the superb pulpits of the cathedrals of Pisa, Siena, and Pistoia. These are essentially Gothic in spirit and execution, and the eye sometimes has difficulty in distinguishing the overcrowded elements of the theme. A pathetic note —typically Gothic—is observable in the panels that tell of the Massacre of the Innocents and of the Crucifixion. The younger Pisano died in 1328, and with him declined the Gothic influence in Italian sculpture.

Giotto also was a sculptor; his work proved to be as influential as his painting. His fame rests on the lower panels that, it is believed, he designed for the campanile, or bell tower, of the Church of St. Mary of the Flower, the cathedral of Florence. They illustrate the occupations of the seasons and the various vocations of men. As in his frescoes, Giotto avoided overcrowding, thus showing himself superior to the Pisani.

The great simplicity of Giotto's panels attracted attention, and sculptors began to abandon crowded scenes. One of these was Andrea Pisano (*d.* 1348), not to be confused with the Pisani just mentioned. He displayed great originality in executing the double bronze doors on the south front of the octagonal Baptistery of San Giovanni in front of the cathedral of Florence. There are twenty-eight panels in all, twenty dealing with the life of St. John the Baptist and eight with the cardinal virtues. We note in them the same studied simplicity as is found in Giotto's work; no doubt, Andrea Pisano had caught something of his spirit. Nearly all the reliefs on the campanile are his and also possess the qualities of simplicity and naturalness displayed on the west doors of the baptistery.

Flemish Painting. In northern Europe, the Flemings were the first to make noteworthy advances in painting. Jan van Eyck (*d.* 1441) and his older brother Hubert made magnificent miniatures in religious books ordered by their patrons. They constantly enlarged their pictures so that finally their miniatures covered large parts of pages or sometimes even entire pages, unencumbered by the text. It is in the art of the van Eyck brothers, therefore, that we observe most clearly the transition of the miniaturist's art into that of the painter.

Another innovation for which the van Eycks are generally regarded as responsible is oil painting The real beginnings of oil painting are obscure; but if the van Eycks were not its originators, they certainly were the first to make successful use of it. They produced the great altarpiece of the "Mystic Lamb," preserved in the cathedral of Ghent, which represents the heavenly Jerusalem as depicted by the apostle John in the

Apocalypse. The sacrificial lamb, emblematic of Christ's sacrifice on Calvary, stands on an altar surrounded by an adoring host representing various classes coming from the four corners of the earth. This picture is worthy of prolonged study, for it reveals to us, as eloquently as a poem, how our forefathers of the fourteenth century regarded religion. The van Eyck brothers also produced fine portraits, some of which portrayed "donors" of religious groups, while others dealt with secular subjects exclusively. Jan van Eyck's "Man with the Pink" and "Marriage of John Arnolfini" are splendid life studies.

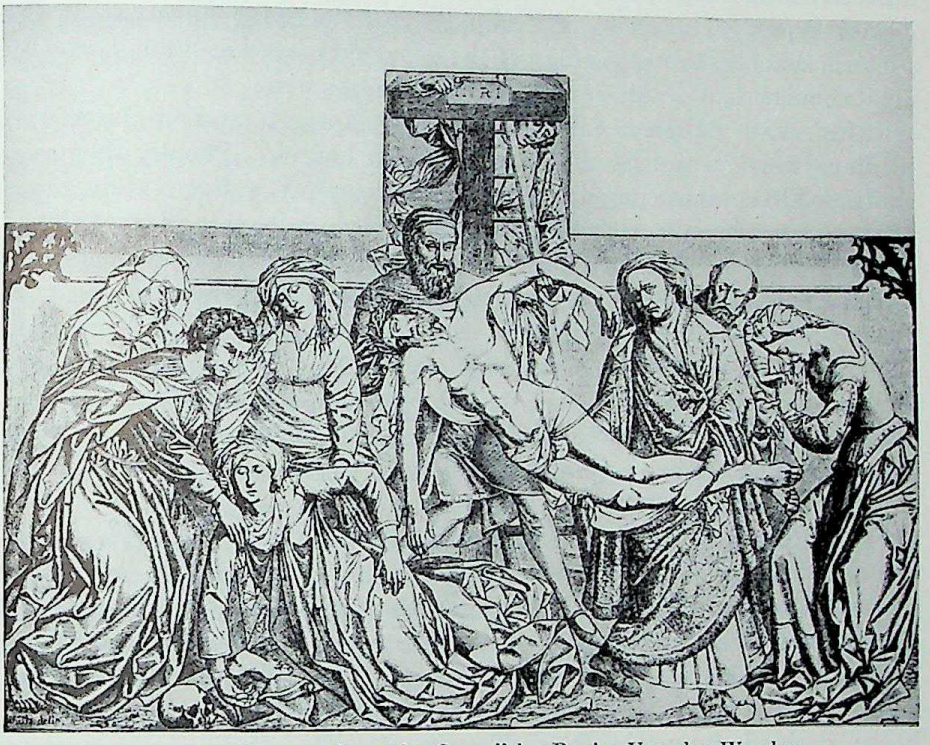


FIG. 70.—"Descent from the Cross," by Rogier Van der Weyden.

Rogier van der Weyden (*d.* 1464), the next important Flemish painter, possessed extraordinary skill in drawing and the ability to depict dramatic incidents and poignant emotion, well illustrated in his "Descent from the Cross." Hans Memling (*d.* 1494) of Bruges, last of the great medieval Flemish masters, was noted for his delicacy of touch and sentimental sweetness. In vigorous drawing, he was inferior to van der Weyden. The "Marriage of St. Catherine" may be regarded as typical of his art.

FLEMISH SCULPTURE. Flemish sculpture, like Flemish painting, attained perfection during the early fifteenth century. In its masterpieces, we find naturalism, religious idealism, and the motif of poignant

grief. Flemish sculpture is apt to be neglected by students, but mistakenly so, for it admirably illustrates the religious spirit of the time. The chief Flemish sculptor was Claus Sluter, who worked at the court of Duke Philip the Good of Burgundy, ruler of the Low Countries from 1368 to 1404. Sluter was commissioned to decorate the Carthusian monastery of Champmol near Dijon, which was to serve as a mausoleum for the dukes of Burgundy. He executed the splendid Moses well, a structure with six sides, on each of which is carved the figure of an Old Testament prophet, one of which is Moses. These statues are marvels of realism; Sluter undoubtedly went to the ghetto to study Jewish types. The tomb of Philip Pot, produced by an artist of the Flemish school, shows the effigy of the departed carved in stone, borne by eight mourners, a dramatic and poignant monument.

Medieval Music. Like painting, sculpture, and architecture, medieval music was used in the service of the church. People, of course, continued to compose popular songs and dances; but, unfortunately, most of these have been lost so that we can form no adequate idea of them. Even Greek and Roman music has passed into oblivion, a great misfortune, for music played an important part among ancient peoples. A singer's art is likely to be forgotten soon after the artist dies. Moreover, ancient music, whether Jewish, Greek, or Roman, was not written down and so was soon lost. This is true also of medieval popular music. We must not assume that there was no such music during the Middle Ages simply because we are acquainted only with the music employed by the church.

The liturgy of the church made abundant use of music. The Mass was its central service; in Roman Catholic churches, it remains essentially as it was in early times. It concerns the teachings of Christianity—Christ's sacrifice for the sins of man. There are two parts in the Mass, the Proper, which is the more important, and the Ordinary. The former is composed of a number of divisions including the Communion, the whole being derived from the New Testament. The Ordinary comprises several hymns and the Credo. The Mass has always been noted for its solemn splendor.

Earlier churchmen did not favor the use of music in religious services, chiefly, apparently, because music was employed in pagan rites, at gladiatorial shows, in the theaters, and in the licentious entertainments of pagan society. But, no matter how austere the clergy might be, music crept into the church. Priests accepted it as helpful, especially in prayer. St. Ambrose (*d.* 397), for example, introduced the antiphonal singing of psalms. The author of at least twelve metrical hymns, he produced the Ambrosian chant used today in the diocese of Milan, the see that he

served so ably and in whose cathedral church his remains still rest. Gregory the Great was as deeply concerned with the music of the church as with other aspects of ecclesiastical life. Because of his influence the plain song is referred to as "Gregorian chant," although Gregory himself was not responsible for all the chants so called.

Plain song, or chant, remained a characteristic feature of church music throughout the Middle Ages until the Renaissance in the sixteenth century, when it was abandoned for the music of Palestrina (*d.* 1594) and other masters. Plain song differs markedly from the music of today. It is a simple air or melody chanted in unison. During the past century the Benedictine monks of Solesmes in France have expended much energy recovering chants that since the Renaissance had fallen into disuse. Today, a growing number of churches employ plain song.

Important musical innovations appeared at the height of the Middle Ages. Guido d'Arezzo (*d.* 1050) completed a system of notation that had been developing for some time. He employed the staff of five parallel lines on which square black notes were placed to indicate pitch. Stems were added to indicate time. This important development enabled musicians to record their work and made possible greater publicity for it, and so helped in the growth of music. People were no longer dependent upon music masters, if they could read notes.

Society was changing rapidly, and urban and rural communities witnessed a great increase in wealth because of growing commerce and industry. There was much popular music, which helped to modify the old musical forms employed in the church. Variations were introduced, and new forms such as the ballad and the madrigal became common. John Dunstable (*d.* 1453), an Englishman, developed the newer forms and became famous for his mastery of polyphony and rich consonances. These musical methods, introduced into the Netherlands, laid the foundations of the Netherlandish school, whose masters were noted for their skill in polyphonic music.

The organ was the most important musical instrument of the Middle Ages. Invented in classical times, it was universally used after churchmen abandoned their disapproval of music for sacred worship. Some organs were small and could be easily carried from place to place. At first, the pipes were provided with sliding devices, for keys were not invented until about 1300. Finally, the keys were arranged so as to form keyboards. A picture of a large fifteenth-century organ is given in a panel of the van Eyck "Mystic Lamb." Other wind instruments such as trumpets, cornets, bugles, and flutes were also used.

Stringed instruments were common. The ancient Greeks had one known as the cithara, played by the fingers, and this instrument gradually

assumed a new form, played by means of a bow, the fiddle used by troubadours. Someone added a keyboard to stringed instruments, thus creating the clavichord, which later developed into the piano.

So many aspects of later medieval life were treated by Gothic artists and so intimately related was this art to all that was best and noblest in the Middle Ages that this period might well be called the "Gothic Age." We have learned how medieval science and philosophy were deeply impregnated with religion. Gothic art fully and uniquely expressed aesthetically this religious and intellectual life. Let us now observe how this function is served also by medieval literature.

FOR FURTHER READING

CHASE, G. H., and C. R. POST: *A History of Sculpture*
FUNCK-BRENTANO, FRANZ: *The Middle Ages*, Chap. XV
GARDINER, ARTHUR: *French Sculpture of the Thirteenth Century*
HAMMETT, R. W.: *Romanesque Architecture of Western Europe*
KIMBALL, FISKE, and G. H. EDGELL: *A History of Architecture*
MÂLE, ÉMILE: *Religious Art in France:* XII *Century*
PIJOAN, JOSEPH: *History of Art*, Vols. II and III
REINACH, SOLOMON: *Apollo*
SAUNDERS, O. E.: *A History of English Art in the Middle Ages*
WEST, G. H.: *Gothic Architecture in England and France*
WOOLBRIDGE, H. E.: *The Oxford History of Music*, Vols. I and II

Chapter XXVIII

MEDIEVAL LANGUAGES AND LITERATURE

Western civilization, because of fortuitous historical circumstances, has spread itself more widely than any other local group that has so far been known.—Ruth Benedict

THE Middle Ages exercised a decisive influence upon the languages and literature of Europe. Greek remained a spoken tongue in Byzantium throughout the whole period. Latin lived on in western Europe as the sole medium of scholarly expression. But the languages spoken by the Celtic, Germanic, Slavic, and nomadic peoples were reduced to writing and, after long literary use, they became capable of expressing every thought and aspiration. Practically all literary languages of modern Europe were formed during the Middle Ages.

Language is a basic as well as a permanent element in culture. Generations come and go, cultural habits are acquired and discarded, but the mother tongue is likely to outlast them all. The study of language is of the utmost importance in education because language is the only medium we have by which to convey thought. Further, it is the chief means of acquainting ourselves with the cultural achievements of the remote and immediate past. Knowledge of our mother tongue and an extensive understanding of foreign languages help us to comprehend the nature of our civilization and make our contributions to it.

Classical and Vulgar Latin. Classical Latin, the form of Latin spoken and written by Cicero, Vergil, and Horace, was a highly cultivated language used only by a part of the population of the Roman Empire. The common people of Rome and Italy rarely spoke classical Latin. Those living in the conquered provinces gradually forgot their ancient mother tongues and learned to speak the Latin of everyday usage, very unlike the pure speech of the great writers, and added many new and strange words. They did not follow in all respects the rules of classical Latin grammar. Further, as prosperity declined in the western parts of the empire, the ruling classes of Rome disappeared and with them the pure literary tongue of Cicero. The provincials continued to speak a provincial Latin called Vulgar Latin. It contributed many words and expressions to the Latin customarily used in the Middle Ages.

Vulgar Latin and the Romance Languages. Vulgar Latin is the parent of Romance languages, which include Spanish, Portuguese,

Catalan, Italian, French, and Rumanian. The classical and Vulgar Latin words in the following table show how the Latin tongue degenerated among the people:

Latin	Spanish	Italian	French	Rumanian	English
femina	femenil	femmina	femme	femeie	feminine
homo	hombre	uomo	homme		homunculus
terra	tierra	terra	terre		terrestrial
liber	libro	libro	livre		library
tempus	tiempo	tempo	temps	timp	time
filius	hijo	figlio	fils	fiu	filial
sol	sol	sole	soleil	soare	solar
amabilitas	amabilidad	amabilità	amabilité	amabilitate	amiable
habere	haber	avére	avoir	aveà	*

* The word "have" was not derived from the Latin word *habere* in spite of the fact that it much resembles it. There are many such words in English and other Indo-European languages. Their similarities can be explained by Grimm's law (see Chap. VII).

In many cases, Vulgar Latin words were entirely different from the classical Latin. In such instances, the Romance languages generally derived their words from the Vulgar Latin form, as illustrated in the following table:

Classical Latin	Vulgar Latin	Rumanian	French	Italian	Spanish	English
equus	caballus	cal	cheval	cavallo	caballo	chivalry
domus	casa	casa	chez	casa	casa	
bellum	guerra		guerre	guerra	guerra	guerrilla

Vulgar Latin in the Strasbourg Oaths. The famous Strasbourg Oaths taken in 842 by Louis the German and Charles the Bald whereby they bound themselves to support each other against their elder brother Lothaire were written in the languages of the people of the eastern (or German) and western (or French) halves of Charlemagne's empire. The language spoken in the western half was a degenerate form of Latin; in fact, it looks much like French or Italian. Almost no examples of the languages spoken at that time by the common people in Italy, France, and Spain have come down to us. For this reason the Strasbourg Oaths are important monuments in the history of European languages. The following quotation serves to give an idea of the popular language in France at that date. For purposes of comparison, it is followed by an equivalent in classical Latin, in modern French, and in English:

Pro deo amur et pro christian poblo et nostro commun salvament, dist di in avant, in quant deus savir et podir me dunat, si salvarai eo cist meon fradre Karlo et in adiudha et in cadhuna cosa, si cum om per dreit son fradra salvar dist. . . .

Pro Dei amore et pro Christiani populi et nostra communi salute, ab hac die, quantum Deus scire et posse mihi dat, servabo hunc meum fratrem Carolum, et ope mea et in quacumque re, ut quilibet fratrem suum servare iure debet. . . .

Pour l'amour de Dieu et pour le salut commun du peuple chrétien et le nôtre, à partir de ce jour, autant que Dieu m'en donne le savoir et le pouvoir, je soutiendrai mon frère Charles de mon aide et en toute chose comme on doit justement soutenir son frère. . . .

For the love of God and for the common salvation of the Christian people and for ours, starting with today, so far as God grants me to understand and to do; I will support my brother Charles with my aid in all things, as one ought justly to sustain one's brother. . . .

GERMANIC LANGUAGES. The Germanic languages, represented now by English, German, Flemish or Dutch, Danish, Norse, and Swedish, became literary languages during the first half of the Middle Ages. We have learned how the Germanic peoples living north of the Danube and east of the Rhine for a long time had been exposed to Roman and Greek culture, which was diffused among them by traders and travelers. From time immemorial the superior culture of classical lands had so charmed them that they imitated it. When the Goths, a Germanic tribe, settled on the fertile soil of southern Russia and came into close relations with the Greeks of that region, they took over the art of writing from them. The Bible was translated into Gothic soon after they became Christians. This translation is of the greatest importance to the student of the Germanic languages, for it gives some idea of what at least one of these languages was like during the third century A.D. So different from any other Germanic language is Gothic that special study is necessary before one can read it.

During the Germanic migrations a number of words were borrowed from the Latin by the Germans. One of the most interesting is the Latin *caseus*, or cheese. From it the Germans derived the word *Käse*, the Dutch *kaas*, and the English "cheese." It is curious to note that of the Romance languages only the Spanish *queso* is derived from *caseus*. The French *fromage* and the Italian *formaggio* in each case are derived from the mold that gave shape to cheese. The Latin word *caupo* meaning "huckster" was derived from the Greek and was borrowed by the Germans. Hence we have the German *kaufen*, Dutch *kopen*, and Anglo-Saxon *cheapan*.

GERMAN IN THE STRASBOURG OATHS. After the Gothic Bible, not until 842 do we find another example of a Germanic language. One

part of the Strasbourg Oaths contains the equivalent of Louis the German's oath to support Charles the Bald in Germanic, which was the language spoken in the eastern half of Charlemagne's empire. This is a very different language from modern German; although one who knows German can decipher a few words, he feels it is practically a foreign tongue. The following excerpt is the Germanic equivalent of the excerpts given on page 455:

In godes minna ind in thes christianes folches ind unser bedhero gehaltnissi, fon thesemo dage frammordes, so fram so mir goe gewizci indi mahd, furgibit, so haldih tesan minan bruodher _____,[1] soso man mit rehtu sinan bruodher scal. . . .

In the Middle Ages, Celtic languages also came into existence as literary organs. The Celts who lived in Gaul (or France), Spain, and Italy had abandoned their mother tongue when they adopted the civilized life of the Romans. The Celts who still occupied the British Isles when the western Roman Empire vanished were destroyed or absorbed by the Germanic Anglo-Saxon invaders. Only a small number of the originally numerous Celtic population were left in Wales, Cornwall, Ireland, and Scotland. They spoke Welsh, Cornish, Irish, or Scottish. Breton was and still is spoken by the Celtic people of Britanny who settled there during the fifth and sixth centuries in order to escape the Germanic invaders of their homes in England. These various Celtic languages were closely related. Cornish has completely passed out of existence. Scottish is still spoken by a small number.

Medieval Latin Literature. Throughout the Middle Ages, Latin remained the language of the church and the intellectual section of society. Poems, sermons, letters, chronicles, encyclopedias, scientific works, philosophical treatises, and saints' lives were written in Latin. These comprise the works of Gregory of Tours (*d.* 594), Gregory the Great (*d.* 604), Isidore of Seville (*d.* 636), Bede (*d.* 735), Alcuin (*d.* 804), and others. Many of these writings have been collected and published in Migne's *Patrologia Latina*, a set of 221 large volumes. But this collection does not contain works written after 1300, of which there was an even greater number. Incidentally, there are still many medieval Latin works in manuscript that should be published. It is interesting to note that the Romans, whose mother tongue was Latin, produced less Latin literature than the people of the Middle Ages, whose mother tongue was French, Spanish, Italian, German, or English.

It is sometimes said by those who know the Latin of Cicero and Horace that medieval Latin literature is of poor quality and of no importance. The language of Cicero indeed is very different from that of

[1] That is, Charles. The name is omitted in the manuscript.

medieval monks like Bernard de Clairvaux (*d.* 1153), but this is no reason for regarding medieval Latin as degenerate. That it was not so polished as that of Cicero is natural; nevertheless, medieval authors like Bede learned to write a vigorous and effective Latin prose. Further, it is a mistake to assume that the language of one age forms the norm of what constitutes good speech or writing. It would be absurd for us today to hold that to speak or write good English we must use the language of Chaucer or Shakespeare. Some medieval Latin literature is the equal of the ancient. It would be hard, for example, to find better historical writing in the Roman world than Bede's *Ecclesiastical History*, and Eginhard's *Life of Charlemagne* is surely as fine as any one of Suetonius's *Lives of the Caesars*.

MEDIEVAL HYMNS. Deeply influenced by religion, medieval culture expressed its faith partly through sacred hymns. These most significant monuments of medieval civilization easily rank with the finest literature of any age. Hymns were not uncommon in the life of the early Christian church; St. Ambrose contributed a number that are still popular. Venantius Fortunatus (530–609), Bishop of Poitiers, composed several lyrical classics. His *O gloriosa Virginum* has ever been a favorite.

O Glorious Lady! throned on high
Above the star-illumined sky;
Thereto ordained, thy bosom lent
To thy Creator nourishment.

Through thy sweet offspring we receive
The bliss once lost through hapless Eve;
And heaven to mortals open lies
Now thou art portal of the skies.

All honor, laud, and glory be,
O Jesu, Virgin-born, to thee;
All glory, as is ever meet
To Father and to Paraclete.

Fortunatus's *Vexilla regis prodeunt* is even more famous.

Abroad the regal banners fly,
Now shines the cross's mystery;
Upon it life did death endure,
And yet by death did life procure. . . .

Blest Trinity, salvation's spring,
May every soul Thy praises sing;
To those Thou grantest conquest by
The holy Cross, rewards apply.

Jerusalem the Golden by Robert de Morlaix, a Cluniac monk, well expresses the high religious hope of medieval folk.

Jerusalem the golden!
With milk and honey blest;
Beneath thy contemplation
Sink heart and voice opprest.

I know not, O I know not,
What joys await us there!
What radiancy of glory!
What bliss beyond compare!

They stand, those halls of Sion,
All jubilant with song,
And bright with many an angel,
And all the martyr throng.

The Prince is ever in them,
The daylight is serene;
The pastures of the blessed
Are decked in glorious sheen. . . .

And they who with their Leader
Have conquered in the fight,
For ever and for ever
Are clad in robes of white.

One of the sweetest of religious hymns is the *Jesus dulcis memoria* often ascribed to Bernard de Clairvaux.

Jesus, the very thought of thee
With sweetness fills the breast;
But sweeter far thy face to see,
And in thy presence rest.

No voice can sing, no heart can frame,
Nor can the memory find,
A sweeter sound than Jesus' Name
The Saviour of mankind. . . .

Jesus, our only joy be thou,
As thou our prize wilt be;
In thee be all our glory now,
And through eternity.[1]

[1] For these and other hymns see M. Britt, *The Hymns of the Breviary and Missal*, pp. 321–322, 123–124, 353–354, 109–110, Benziger Bros., New York.

FEUDAL EPICS. CHANSONS DE GESTE. Particularly interesting are the secular literary productions in the new languages of the Middle Ages. The first type to attract our notice is the heroic epic, the earliest example of which is the *Song of Roland*. Written shortly before the First Crusade (1096–1099), it expresses the life, passions, and ideals of the rough lords who dominated European society. As a literary production, it probably ranks with the epics of Homer and Vergil.

The *Song of Roland* tells of Charlemagne, who for seven years has sought to win Spain from the Mohammedans. When he has subjected the entire country save Saragossa, Marsile, its king, offers peace and promises to become a Christian. Roland argues against accepting his treacherous offer and urges Charlemagne to continue the war. He is overruled by the arguments of Ganelon, who becomes bitterly jealous when Roland is chosen to carry the message of acceptance to Marsile. Ganelon turns traitor, leagues himself with Marsile, and helps plan the destruction of Roland. As Charlemagne leaves Spain, his rearguard commanded by Roland is attacked at Roncevalles.

Roland and his followers prepare for the impending battle. Turpin, the archbishop, preaches a sermon in which he expresses the love of the fighting chivalry for Christianity. This discourse illustrates the virtues of feudal loyalty.

> My lords barons, Charles left us here for this;
> He is our king, well may we die for him;
> To Christendom good service offering.
> Battle you'll have, you all are bound to it,
> For with your eyes you see the Sarrazins.
> Pray for God's grace, confessing Him your sins!
> For your soul's health, I'll absolution give;
> So, though you die, blest martyrs shall you live,
> Thrones you shall win in the great Paradis.
> The Franks dismount, upon the ground are lit.
> That archbishop God's benediction gives.
> For their penance, good blows to strike he bids.
> The Franks arise, and stand upon their feet,
> They're well absolved, and from their sins made clean,
> And the archbishop has signed them with God's seal;
> And next they mount upon their chargers keen; . . .

The enemy approaches, and Roland counsels Oliver, his close friend.

> Fair shines the sun, the day is bright and clear,
> Light burns again from all their polished gear.
> A thousand horns they sound, more proud to seem;
> Great is the noise, the Franks its echo hear.
> Says Oliver: "Companion, I believe

Sarrazins now in battle must we meet."
Answers Rollanz: "God grant us then the fee!
For our king's sake well must we quit us here;
Man for his lord should suffer great disease,
Most bitter cold endure and burning heat,
His hair and skin should offer up at need.
Now must we each lay on most hardily,
So evil songs ne'er sung of us shall be.
Pagans are wrong: Christians are right indeed.
Evil example never will come of me."

A battle ensues, and the Franks perform prodigies of valor.

Common the fight is now and marvelous.
The count Rollanz no way himself secures,
Strikes with his spear long as the shaft endures,
By fifteen blows it is clean broken through;
Then Durendal he bares, his sabre good,
Spurs on his horse, is soon to strike Chernuble,
The helmet breaks, where bright carbuncles grew,
Slices the cap and shears the locks in two,
Slices also the eyes and the features,
The hauberk white, whose mail was close of woof,
Down to the groin cuts all his body through
To the saddle; with beaten gold 'twas tooled.
Upon the horse that sword a moment stood,
Then sliced its spine, no join there any knew,
Dead in the field among thick grass them threw. . . .
The count Rollanz, he canters through the field,
Holds Durendal, he well can thrust and wield,
Right great damage he's done the Sarrazins
You see them one on other, dead in heaps,
Through all that place their blood was flowing clear!
In blood his arms were and his hauberk steeped
And bloodied o'er, shoulders and neck, his steed. . . .

The Franks are hopelessly outnumbered. At the beginning of the struggle, Oliver has urged Roland to sound his horn to recall Charlemagne; but he has refused, thinking it unworthy of a vassal. But as the fight becomes desperate and many Franks are killed, he yields.

And with great pain sounded his oliphant:
Out of his mouth the clear blood leaped and ran,
About his brain the very temples cracked.[1]

[1] *The Song of Roland*, Done into English, in the Original Measure by Ch. Scott Moncrieff, ll. 1002–1016, 1127–1142, 1320–1334, 1338–1344, 1762–1764, Chapman & Hall, Ltd., London.

Charlemagne returns too late; Roland's heroic band is dead. Much fighting follows, and the Saracens are sorely punished for their treachery. The emperor returns to his castle at Aix-la-Chapelle, and Roland's fiancée Aude falls dead when she hears of his death. Ganelon, proved a traitor, is cruelly punished, being torn asunder by horses.

The *Song of Roland* is the characteristic literary masterpiece of the rough fighting society of the eleventh and twelfth centuries. It exalts the virtue of fidelity to the promised word, loyalty of vassal to lord, bold fighting, hatred of treason, and detestation of infidels, who, according to the prejudices of the time, are supposed capable of the worst crimes. The *Song of Roland* was composed by some great poet who sang to the pilgrims traveling the long and dusty road from France through Spain to the tomb of St. James in Compostela. It became popular among feudal noblemen in every land, the first of a literary type, the *chansons de geste*, or "songs of heroic deeds." These number over one hundred and tell romantic stories of feudal heroes after the manner of Roland; the cycle dealing with *William of Orange* is one of the best. Chansons de gestes were recited by jongleurs, wandering minstrels who traveled from court to court seeking a livelihood by entertaining noblemen in their castles with their dancing, acting, sleight-of-hand performances, and singing.

The *Lay of the Cid*, written in Spain about 1140 and springing from the same social and economic environment, is very like the *Song of Roland*. The hero is the Castilian Ruy Diaz de Bivar, who, banished from Castile, collects a band of sixty men to war on the Moors. Soldiers flock to his standard, and he conquers Valencia. Though exiled, the Cid remains loyal to the king, ever seeking reconciliation with him, which is finally achieved after many adventures. The poem exalts the virtue of loyalty and hard fighting, so admired by the feudal nobility. Its language is vivid and specific, its action vigorous.

> Before their breasts, the war-shields there have they
> buckled strong,
> The lances with the pennons they laid them low along,
> And they have bowed their faces over the saddlebow,
> And thereaway to strike them with brave hearts did they go.
> He who in happy hour was born with great voice did call:
> "For the love of the Creator, smite them, my gallants all.
> I am Roy Diaz of Bivar, the Cid, the Campeador."
> At the rank where was Per Vermudoz the mighty strokes
> they bore.
> They are three hundred lances that each a pennon bear.
> At one blow every man of them his Moor has slaughtered there,
> And when they wheeled to charge anew as many more were slain.

You might see great clumps of lances lowered and raised
again,
And many a shield of leather pierced and shattered by
the stroke,
And many a coat of mail run through, its meshes all tobroke,
And many a white pennon come forth all red with blood,
And running without master full many a charger good.
Cried the Moors "Mahound!" The Christians shouted on Saint
James of Grace.
On the field Moors thirteen hundred were slain in little
space.[1]

TROUBADOURS AND THEIR LYRICS. A new literary type appeared in the twelfth century—the lyric sung by troubadours. Wealth, leisure, and refinement were increasing among the noble classes. The *chansons de geste* revealed slight interest in woman, but the lyrics of the troubadours stressed the theme of love. One of the most remarkable of the troubadours was Duke William IX of Aquitaine, who wrote in the dialect of southern France, the Provençal. His poetry is filled with the joy of life, love for the beautiful, and good comradeship. Nor is it militantly Christian as were the *chansons de geste*. The poet, going on a crusade to the Holy Land, feels a pang of conscience over his divided loyalty.

Since now I have a mind to sing,
I'll make a song of that which saddens me,
That no more in Poitou or Limousin
Shall I love's servant be. . . .

No one has expressed the troubadour's joy of life better than Jaufré Rudel, a Provençal nobleman who went to the Holy Land as a crusader in the middle of the twelfth century. The following poem written before his departure shows his love for the beautiful world and for an anonymous lady, both sentiments typical of this kind of poetry:

When the days lengthen in the month of May,
Well pleased am I to hear the birds
Sing far away.
And when from that place I am gone,
I hang my head and make dull moan,
Since she my heart is set upon
Is far away.

GOLIARDIC POETRY. Joy of living often bordered upon the frankly pagan; students and wandering folk expressed themselves in the freest fashion. Wandering scholars jauntily called themselves "goliards," that

[1] *The Lay of the Cid*, translated into English Verse by R. Seldon Rose and Leonard Bacon, pp. 25–26. University of California Press, Berkeley, California.

is, sons of Goliath. The word "goliard" is about equivalent to our "Philistine." The so-called "Archpoet" of the goliards, a versifier who lived in Germany at the time of the Emperor Frederick Barbarossa (*d.* 1190), found it hard to coax a living out of the nobles. He wrote the following immortal *Confession of Golias:*

Seething over inwardly
With fierce indignation,
In my bitterness of soul,
Hear my declaration.
I am of one element,
Levity my matter,
Like enough a withered leaf
For the winds to scatter.[1] . . .

The *Gaudeamus igitur*, or *Let Us Rejoice* is the most famous of goliardic lyrics.

Let us live, then, and be glad
While young life's before us!
After youthful pastime had,
After old age hard and sad,
Earth will slumber o'er us.

Brief is life, and brevity
Briefly shall be ended:
Death comes like a whirlwind strong,
Bears us with his blast along;
None shall be defended. . . .

Perish cares that pule and pine!
Perish envious blamers!
Die the devil, thine and mine!
Die the starch-necked Philistine!
Scoffers and defamers!

THE FABLIAUX. The *fabliaux* were another literary type that developed during the Middle Ages. The feudal epic was popular with the rough fighting baronage, the fabliaux came into existence among the men of the towns. These short stories are pungent with wit and satire. Because the irreverent spirit of these tales originated among the hagglers in the market place and the loiterers in the taverns, it is called "bourgeois," in contrast to "feudal."

BEAST EPICS. Of the beast epics, long beast tales in the mock-epic manner, the poem *Reynard the Fox* is the greatest. It originated in

[1] WADDELL, H., *The Wandering Scholars*, pp. 116, 205, 155, Houghton Mifflin Company, Boston.

Flanders and has for its theme the clever pranks of the fox called Reynard. Our forefathers in medieval times lived closer to animals than we do and noted their characteristics carefully. Reynard himself points out the fox's cunning when describing his children Rossel and Reynardine. "They are," he said, "of the right hair and like me both in countenance and quality; they play grinning, entrap soothing, and kill smiling; this is the true nature of the fox, and in this they are perfect, which is great pride unto me." The awkward situations into which the unscrupulous fox forces the other animals of wood and field are amusing. But *Reynard the Fox* is also a satire upon social and political conditions of feudal times. Human foibles are treated ironically, and moral lessons inculcated. The lion is king, the other animals are his vassals. Reynard is typical of the baron who seeks to profit through craft and violence. He has committed so many outrages upon his fellow creatures that, on their complaint, he is summoned to court. He manages hypocritically to win the lion over to his side by telling of a treasonable plot among the animals and declaring that he has made away with a great hoard of gold and silver which was to have financed the rebellion. Hoping to get some of this treasure and believing the lies about treason among the other animals, the lion forgives Reynard, who retires to his castle. But Reynard cannot change his ways in spite of the fact that he has confessed his sins and offered penance. He pounces on Kyard, the hare, and tears out his throat, whereupon Reynard's wife and young ones "feast therewith merrily, eating the flesh, and drinking the blood to the king's health." As a result of this and other tricks, Reynard is again summoned to court. Once more he is condemned, but again his subtle deceit saves him. The king forgives him and makes him the greatest favorite in the land.

Romances. During the twelfth century, romances began to supplant the old feudal epics in popular affection. Feudal epics are the prized stories of the rough fighters of the tenth, eleventh, and twelfth centuries. Romances, on the other hand, were admired by the more refined society of the twelfth to the fifteenth centuries. In the romances, the element of social grace is more prominent—summed up in the word "courtesy," from the French *courtoisie*. Romances treat of ideal gentlemen, fair ladies, dark plots, cruel husbands, animals that talk, fairies, magicians, enchanted forests, marvelous adventures, and other strange things. Most of them deal with the men and women at the court of King Arthur. The stories of King Arthur and the Round Table are legends that sprang up in the Celtic lands, especially in Wales and Brittany. Their popularity is attested by the fact that even in our day readers find them entrancing. Tennyson's *Idylls of the King*, and Lowell's *Vision of Sir Launfal* were inspired by this literature.

Knightly idealism and religious devotion were the inspiring motives of these romances. Thus, in the *High History of the Holy Grail*, knights of the Round Table go forth to seek "the most holy vessel that is called Grail, wherein the precious blood of the Saviour was received on the day that he was put on rood and crucified in order that he might redeem his people from the pains of hell." Strange adventures, undaunted courage, mighty combats, heroic love, ideal faith, and lofty morality fill its pages.

The first writer to embroider the legends of King Arthur was Geoffrey of Monmouth (*d.* 1154), an Englishman who wrote the *History of the Kings of Britain*. Others imitated him. Thus Chrestien de Troyes, who lived in the same century, produced a number of exceedingly popular romantic poems in French. His *Érec and Énide*, *Yvain*, and *Lancelot* are among his best. The romances of Marie de France, a French lady who lived in England at the court of King Henry II (*d.* 1189), are exquisite; they are briefer than those of Chrestien de Troyes and probably pleased noble ladies and brave knights better. Among the immortal romances of this time is *Aucassin and Nicolette*, by an unknown author. The following description of Aucassin is characteristic of this type of romance:

> Aucassin was the name of the lad. Fair he was, and pleasant to look upon, tall and shapely of body in every whit of him. His hair was golden, and curled in little rings about his head; he had grey and dancing eyes, a clear oval face, a nose high and comely, and he was so gracious in all good graces that naught in him was found to blame, but good alone. But Love, that high prince, so utterly had cast him down, that he cared not to become knight, neither to bear arms, nor to tilt at tourneys, nor yet to do aught that it became his name to do.

Such romances became the popular reading matter of the noble classes of Europe. Most of them were written in France, the land where feudal society reached its most perfect development and where "courtesy" was most highly idealized. But the anonymous *Nibelungenlied*, or *Song of the Nibelungs*, one of the greatest productions of this age, came from Germany. It was based upon the ancient Germanic saga of pre-Christian times dealing with the adventures of Siegfried and Brunhild in connection with the fabulously rich hoard that Siegfried seized from the dragon Fafnir. Not all German romances were based upon the tales of ancient Germanic heroes, however; Arthurian romances were also produced. The greatest of these were Wolfram von Eschenbach's *Parzifal* and Gottfried von Strassburg's *Tristan*.

Chronicles. Chronicles, a form of historical writing, appeared in great numbers during the Middle Ages, usually in prose, but sometimes in rhyme. They were written by monks in monasteries or in cathedral schools. One of the peculiarities of chronicles is that events are arranged

according to years. Hence, facts are presented chronologically and not logically. Some chronicles are brief, and the facts given are scant. Others like Matthew Paris's *Chronicle* and Otto von Freising's *Two Cities* (that is the two cities, earthly and heavenly, as set forth in classic fashion by St. Augustine of Hippo) are historical masterpieces. Froissart's chronicle dealing with the Hundred Years' War portrays in vivid prose the colorful activity of the fourteenth century. Kings, princes, knights, and ladies pass before us. There is much ceremony, court life, dialogue, fighting, and heroic endeavor. For hundreds of years, readers have found pleasure in Froissart's pictures of the declining days of feudal splendor.

Dante Alighieri. The greatest of all writers to produce a work that fully represents medieval culture at its very height was Dante Alighieri (1265–1321). A citizen of Florence, he was exiled by one of the factions that ruled the city. For the rest of his life, he wandered about northern Italy, eager to return to his beloved city but too proud to do so as a penitent. During these years, he wrote his great works, which have permanently enriched the world's literature.

Dante's writings require much study before they can be fully appreciated; this is true, in fact, of most great classics. Each literary masterpiece, sculpture, painting, or building is in some measure related to the age in which it was created. Hence, the *Summa* of Thomas Aquinas, the "Hermes" of Praxiteles, the "Venus" of Botticelli, or a Gothic cathedral is a guide to the life and thought of the age that produced it. Dante in his literary works helps us to understand the life and thought of the bustling cities of Italy at the opening of the fourteenth century. But he is even more significant; he reveals what medieval man believed about himself, the world, the origin and destiny of man, and the purpose of all things. Clearly, Dante cannot be read rapidly like a contemporary novel.

The first of Dante's principal works was the *Vita Nuova*, or *New Life*. This deals with Beatrice, whom he first met when she was but nine years old. Exactly 9 years later (9, being 3 times 3, constituted a mystical number), he once more saw the gracious girl, who this time spoke to him. He fell in love with her, but she married someone else. Dante thereafter saw her but seldom but kept her image ever before his mind. It became a vision of perfection, an ideal of beauty that he never forgot. To describe it, he wrote his *Vita Nuova*, which contains many splendid lyrics; these alone would have sufficed to give Dante an enviable place in literature. Beatrice ever assumed new and deeper meaning in Dante's mind. She guided him into the world of knowledge and understanding, became the Lady Philosophy of his later life. He now studied the writings of Cicero and Boethius. All this is discussed in the *Banquet*, a symbolical account of his philosophic feast. Dante wrote both the *Vita Nuova* and

the *Banquet* in his native Tuscan, or Florentine Italian. Others wrote in Latin, but Dante believed that the mother tongue should be used for literary work. He wrote a special treatise setting forth his views, entitled *De vulgari eloquentia*, or *On the Mother Tongue*. This work is important in showing how the days of Latin's supremacy as the literary and scholarly language were passing.

Another work, *De monarchia*, or *On Monarchy*, deals with the perplexing problem of what constitutes the right or best kind of government. Dante was intensely patriotic and dearly loved his native Florence. But he was obliged to spend the last twenty years of his life a wanderer in other cities and at the courts of strange princes. Was there no way to eliminate all the factional quarreling that marred the peace and quiet of Italy? Yes, through the governance of one man, the emperor who ruled the Holy Roman Empire, who would give peace and justice to all mankind. *De monarchia* presents some conception of what the ideal Holy Roman Empire and the majesty of its emperors meant to our medieval forefathers.

The greatest work of Dante is the *Divine Comedy*, which occupied the later years of his exile. This magnificent poem is written in *terza rima*, or triple rhyme, and contains the three following parts: *Hell*, or *Inferno; Purgatory*, or *Purgatorio;* and *Paradise*, or *Paradiso*. It has been admirably translated by Longfellow. The theme of this vast composition is the spiritual experience of the author. No adequate idea of its contents can be gained from a brief description. In the sixth book of the *Aeneid*, Vergil had described the visit of Aeneas to the realm of the dead, where he saw various departed souls and also mythological beings with whom he had had contact while wandering from Troy to Latium. Dante uses the same literary device but to the visit to hell adds visits to purgatory and paradise as well. The poet Vergil becomes his guide through hell, where Dante sees the souls of men who have done wrong in this life. Vergil also guides Dante through purgatory, where he sees many more souls. But it is Beatrice, the very image of human perfection, who conducts him through paradise. She draws him up into the sky and together they visit the seven planets, of which the sun is one, for Dante accepted the Ptolemaic teaching about celestial mechanics. Beatrice explains to him many facts about these celestial matters, all of which makes the poem most interesting as a monument of culture. In paradise, Dante talks with many saints, scholars, apostles, Church Fathers, and ancient heroes. This section constitutes a poetical sketch of the intellectual history of the Middle Ages.

Such are a few of the features of this great poem, which might well be used as a textbook to introduce a student to the civilization of the Middle Ages. Dante was a layman, a citizen of Florence; he was not

educated as were the scholastic philosophers, doctors, and lawyers. He was an intelligent layman whose curiosity led him to explore the learning of his day. The *Divine Comedy* shows how deeply all elements of medieval society, whether priest, noble, or townsman, shared in scholastic philosophy, Roman law, Galenic medicine, and the Christian faith. Is there any other poetic creation that so amply embraces the highest aspirations, hopes, and knowledge of its age?

Geoffrey Chaucer. Another poet of the highest order, though not so great as Dante, was Geoffrey Chaucer (*d.* 1400). He was an Englishman, living in London, and came from a family that had made some money in business. Chaucer wrote many works, but his immortal creation is the *Canterbury Tales*, in which thirty pilgrims are described as having gathered at the Tabard Inn in Southwark, a town on the Thames opposite London, whence they proposed to set out to Canterbury to visit the tomb of St. Thomas à Becket, a martyr especially popular in England. Each member of the group was to tell two tales on the way to Canterbury and two while returning. Only twenty of the tales were completed. The entire collection is preceded by a *Prologue*, which briefly sets forth the occasion of the tales and describes each of the pilgrims. The *Prologue* affords an excellent portrayal of medieval character; in fact, it may be regarded as a résumé of fourteenth-century social England. The habits, thoughts, ideals, and institutions of the time are revealed with sympathetic humor and insight. This is true likewise of the tales, each of which is worthy of extended study. Like Dante's *Divine Comedy*, they are documents illustrating the cultural complex of the day.

William Langland. Not so widely known as Chaucer, but equally worthy of study is William Langland, who—according to the best opinion—wrote the *Vision of Piers Plowman*. Little is known about Langland, but it is certain that he was a late contemporary of Chaucer. The name "Piers Plowman" is not that of a person but is roughly equivalent to "Everyman." The poem, like the *Divine Comedy*, recounts a vision, a literary device popular during the Middle Ages, enabling the poet to criticize existing conditions by contrasting them with ideally perfect ones. The author of the *Vision of Piers Plowman* pictures the social, political, and religious life of the time, especially stressing its moral and ethical implications. His "reason for writing was not to describe the outward pageantry of life, but to give expression to his own discontent with things as they were and to urge men to live life better. The need for self-expression and a passion for reforming the world are the motives of his writing."

Scandinavian Sagas. It remains to note the saga literature of the Norse, or Scandinavian, world. This stood apart from the literary

activity of the rest of medieval society because the Norse lived on the outer limits of the then known world—in Scandinavia, the Orkney Islands, Iceland, and Greenland. The sagas are rugged and vigorous tales, the oldest reproducing faithfully pre-Christian religious, moral, and social ideas. The *Eddas* describe gods and heroes. Their authorship is composite, dating from the ninth to the twelfth century. Many other sagas were written, the best dating from the Heroic Age, also called the Saga Age (930–1030) because this was the period of the greatest Scandinavian, or Viking, literary activity. The *Njals Saga*, *Laxdaela Saga*, and the *Volsunga Saga* are a few of the most striking. The *Heimskringla Saga* by Snorri Sturluson is a kind of chronicle; it should be read to form some picture of the restless wanderings of the Vikings from Scandinavia to Iceland, Greenland, England, western Europe, Russia, and Constantinople.

Medieval literature, like that of any other era, is a part of the cultural complex of the age that produced it. To read it is to study medieval civilization and its noteworthy achievements directly. Many writers in subsequent times have drawn themes, religious and secular, from the rich storehouse of medieval literature; hence, no one can read modern literature without meeting constant references to these earlier productions. We now turn to another significant feature of the Middle Ages, namely, progress in technology.

FOR FURTHER READING

ALLEN, P. S.: *Mediaeval Latin Lyrics*
——— and H. M. JONES: *The Romanesque Lyric*
Arthurian Romances by Chrétien de Troyes (*Everyman's Library*)
Aucassin et Nicolette, ed. by Eugene Mason (*Everyman's Library*)
COULTON, G. G.: *Chaucer and His England*
KER, W. P.: *The Dark Ages*
LEGOUIS, E. H., and L. F. CAZAMIAN: *A History of English Literature*
OLRIK, AXEL: *Viking Civilization*
SCHLAUCH, MARGARET: *Medieval Narrative: A Book of Translations*
TAYLOR, ARCHER: *The Literary History of the Meistersinger*
The High History of the Holy Graal, ed. by Sebastian Evans (*Everyman's Library*)
The Histories of the Kings of Britain by Geoffrey of Monmouth, tr. by Sebastian Evans (*Everyman's Library*)
The Niebelungenlied, ed. by D. B. Shumway
WADDELL, HELEN: *Mediaeval Latin Verses*
———: *The Wandering Scholar*
WRIGHT, C. H.: *A History of French Literature*

Chapter XXIX

MEDIEVAL INVENTIONS AND TECHNOLOGY

During the last thousand years the material basis and the cultural forms of western civilization have been profoundly modified by the development of the machine.—Lewis Mumford

CONTRARY to a common impression, the Middle Ages made noteworthy contributions to the history of technology. The view that only religion flourished during these centuries is untenable. Our medieval ancestors not only inherited from classical times methods of making tools and machines but also exhibited remarkable ability in developing new tools and mechanical devices. A study of these contributions reveals the fact that medieval inventive skill, closely related to that of preceding times, laid indispensable foundations for the development of modern technology.

Early Medieval Tools. Tools used during medieval times were, for the most part, borrowed from the Greeks and Romans, who, in turn, were heirs of the cultural development of the Egyptian and Tigris-Euphrates Valley civilizations. But the men of the Middle Ages modified the tools thus borrowed and created new ones. Early medieval agriculture, being the lineal descendant of Roman agriculture, was carried on with such ancient tools as the hoe, pruning hook, pail, sheepshears, plow, spade, wagon, cart, sickle, scythe, flail, yoke, wine press, cider press, and millstones. But there were a number of significant inventions in the Dark Ages, such as the stirrup and the horse collar with hames. The harrow also was a medieval invention and, like the horse collar and hames, left an enduring mark upon the history of farming. The carpenter's tools—hammer, nails, saw, ax, adz, auger, plane, and chisel—were all derived from Greco-Roman times. The smith's equipment remained what it had been for centuries before Christ—forceps, anvil, sledge, and bellows. Surgeons, too, continued to use the forceps, saws, and knives of their Greco-Roman predecessors. Pumps and pipes to convey water were common. The windlass was used in shipping. Builders employed the derrick to hoist stones in the construction of castles and churches. The Greek and Roman derrick was an elaborate affair: cables were passed through pulleys; the tackle was worked by means of a drum attached to a large wheel revolved by men treading on its spokes. Such derricks, or cranes, were usual in medieval towns, especially at

harbors like Bruges, Ghent, Antwerp, and Brussels, where they were used in loading and unloading ships.

Early Mills. One of the most important of all inventions was the mill. This was an application of the principle of the wheel to the grinding of grain, which had become the chief food of man since the Neolithic Age. The first mills, however, were simple devices and did not employ the wheel. They were flat stones over which the grain was spread and crushed by a rounded stone. Sometimes a bowl made of stone was used. The greatest variety of such querns was produced all over the earth wherever human beings were living during the Neolithic and Bronze ages. The first mill to be run by a water wheel was composed of a wheel with paddles affixed at one end of an oak shaft and a millstone at the other. This device was placed in a stream, the lower end with paddles attached being firmly secured to the bed by a hole in a large stone, while the upper end, to which the millstone was attached, revolved in a hopper. Such mills invented by the Greeks and Romans were not unusual in northern Europe at the beginning of the Christian Era. The remains of a mill of this kind, dating from the fifth century A.D., have been found in Ireland. Soon, sprocket, or toothed, wheels began to be employed, revolutionizing milling. The sprocket wheel is an invention of the utmost importance without which most subsequent mechanical developments would have been impossible. To convince ourselves of this fact, it is necessary merely to study a number of machines in common use and note the essential part toothed wheels play in them.

Such simple milling devices were very defective. The rate at which they ran depended upon the flow of the river. In the new type the revolutions of the millstone depended upon the gearing. The shaft to which the paddle was fastened drove a toothed wheel fastened to the shaft, which drove the millstone. The rapidity of revolution depended not upon the flow of water but upon the relative diameters of the two geared wheels. Slow-running rivers could be made to turn millstones rapidly, and vice versa. Such mills were usually run by undershot water wheels. Often, as in Rome, they were built on rafts and placed in rivers. Mills of this type were plentiful in the more thickly populated parts of Italy during the decline of the Roman Empire in the West. Querns, however, remained in use throughout the Dark Ages, but only in such economically backward regions as northern Scandinavia and the Scottish Highlands. Other communities were served by the primitive mill with millstone and water wheel attached at opposite ends of the shaft. But as medieval population grew and Mediterranean culture spread into the regions of the North, mills run by gears supplanted primitive devices.

The extraordinary growth of commerce, towns, and urban population during the tenth and eleventh centuries demanded changes, and at least

two modifications in milling must be noted. The first was the mill driven by wind, a device that developed in Persia and passed to the West during the period of the Crusades. The second was the horse gin, or mill driven by horses. It is difficult to ascertain what these early mills looked like. Sawmills also became common during the fourteenth century, but were of a very primitive make. A shaft, driven by an undershot water wheel carried wooden pegs; these repeatedly jerked in one direction the saw, which was fastened to the frame of the mill. The log or plank, it should be noted, was not held tightly to the saw. This had to be done, it appears, by human hands. This sawmill was a crude device from our point of view, but significant because it helps us to form some idea of the simple beginnings from which our modern machinery developed.

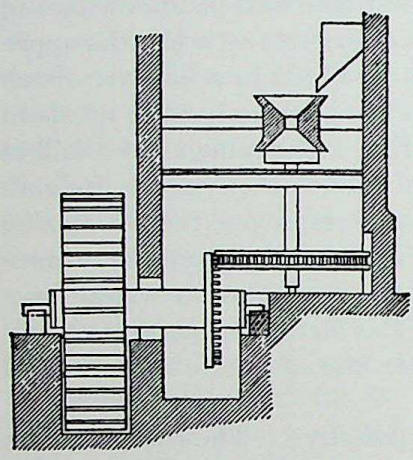


FIG. 71.—Geared mill driven by water, about 1000.

WEAVING. Weaving, one of man's oldest and most valuable arts, came into existence during the Neolithic Age and had become a fine art by the dawn of history. For sheer fineness of weave, the linen cloths swathing Egyptian mummies have never been surpassed. When, where, and by whom the art of weaving was invented remains a secret. The idea of weaving cloth may have been suggested by the art of basketry, which was also an early craft. In weaving cloth, two sets of fibers are employed. Those extending throughout the length of a piece of cloth are known as the "warp." Those passing back and forth through the warp are called the "weft" or "woof." Someone invented a device called the "loom" to facilitate this process that, like the wheel, spread throughout the Old World.

Long before the dawn of history, looms were common among all peoples who raised sheep and goats. Apparently the loom was invented independently in America; the Incas of South America wove as fine cloth as could be produced on the looms of the Old World. The first looms were simple contrivances, but the more advanced types that came into existence during Greco-Roman days and that were inherited by medieval people developed certain modifications—the beams to which the ends of the warp were fastened; the leach rods which spread the warp; the heddles, or sets of cords, designed to guide the warp threads and raised by treadles; the shuttle which passed the weft back and forth, and the reed which held up the warp. Such looms were commonly used during Roman days. Some mechanical improvements no doubt came later from China or from Persia.

The weaving of silk cloth demanded machines of greater precision than those used for the manufacture of woolen cloth. Manufacture of silk cloth was a monopoly of Byzantine manufacturers from Justinian's time until the Crusades. From Byzantium, therefore, some of the technical improvements in weaving passed, it appears, first to Italy and next to northern Europe. But the history of the improved looms during medieval times remains a subject about which we know all too little.

Spinning. The process of spinning is at least as ancient as that of weaving and complementary to it. The distaff around which the wool or flax was wound was held under the left arm. The twisted threads were fastened to the spindle, a stick of wood about a foot in length and pointed at both ends, one of which was provided with a hook. The stick was passed through a perforated stone and securely fastened in the middle. The spinner gave a rotary motion to the spindle by whirling it between

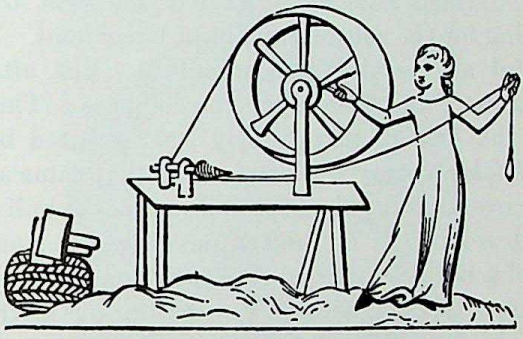


Fig. 72.—Late medieval quilling mill.

thumb and forefinger. When sufficiently twisted to form yarn, the thread was released from the hook and wound around the spindle. This method of producing yarn was widely employed in medieval times and still may be observed in the Balkan countries. Finally, the principle of the wheel was applied to the process of spinning, but not until late medieval times. Weavers desired an even thread wound tightly on the bobbin, or quill, that carried the yarn for the shuttle. Someone thought of using a wheel to drive a quilling machine by means of a cord that served as a belt. The wheel was turned by hand, and the yarn was tightly and evenly wound on the quill from the spindle. Such quilling devices were common by the year 1300. Soon this machine was modified for purposes of spinning. Little is known about the early history of the spinning wheel. This is unfortunate because the invention involves the creation of a mechanical spindle—a most remarkable discovery, widely used by the close of the Middle Ages.

Fulling. The fulling of cloth—whereby it was cleansed, shrunk, and thickened—was a laborious process in medieval times, for it had to be done without mechanical help. Cloth was placed in vats and trodden

by foot, a method that was in use until early modern times. By 1500 the principle of the wheel was commonly applied to fulling in the cloth-manufacturing towns of Italy. There were several types of fulling mills. One, driven by an undershot water wheel, consisted of two heavy wooden beaters, which were raised by a cam attached to the shaft so as to give a specific up-and-down motion. Cams, highly specialized devices, were introduced only gradually, probably first in connection with fulling machinery. They are pieces of wood or iron fastened to a wheel or shaft to produce the irregular motions so necessary to the complicated work of modern machinery. The appearance of cams before the close of the Middle Ages marks a new departure in mechanical invention.

Compass and Cross-staff. Navigation also underwent important changes during the Middle Ages. From earliest times, sailors were wont to set their course by the stars, ascertaining direction from the position of the polestar. Norse navigators steered due west from Trondheim in Norway, aiming for the southern point of Greenland. That they were usually successful argues skillful seamanship. But after 1300 sailors began to depend more and more upon the compass. This device can be traced back to the Arabs and probably was invented by the Chinese; in the *Arabian Nights* a story is told of a ship that came so near a mountain of magnetic iron that it pulled the nails out of the hull and unfastened timbers. The development of the compass depended on the discovery that if one end of a needle, fastened on a cork floating in water, is rubbed with magnetic iron the magnetized end points north, the other south. The compass enabled mariners to ascertain directions even when clouds obscured the sky and no stars could be seen. The first Europeans to make constant use of the compass were the sailors of Amalfi, a town in southern Italy that enjoyed commercial relations with Egypt and Syria.

Although the mariner's compass marked a great step forward in the development of scientific navigation, sailors remained dependent upon the polestar to ascertain their location. The cross-staff, an instrument that came into general use during the last centuries of the Middle Ages, enabled them to ascertain their approximate location when on the high seas far from land.

Astrolabe and Armillary Sphere. More important than the cross-staff was the astrolabe, a device that had been employed in ancient Greek days. Like the cross-staff, it was used in taking the altitude of stars by mariners as well as by students of astronomy and astrology. The astrolabe was a circular piece of copper divided into 360 degrees. A pointer, provided with sights and fastened in the center, moved over the surface. The observer moved the pointer until he saw the star through the sights. By reading the angles on the copper plate, he noted the altitude of stars. About 1480, an improved model appeared, widely

known as the mariner's astrolabe. Gradually, tables were drawn up showing the elevation of stars at certain latitudes, so that, by ascertaining the altitude of a star and studying the tables, sailors were able to judge the approximate position of their ships.

Armillary spheres provided with zodiacal bands were employed in medieval times by scholars to demonstrate the nature of the earth and more especially by astrologers to forecast events. The word "armillary" is derived from the Latin *armilla*, or bracelet. An armillary sphere was a globe composed of rings, or circles, representing the Equator and the tropics of Cancer and Capricorn. Armillary spheres were widely used

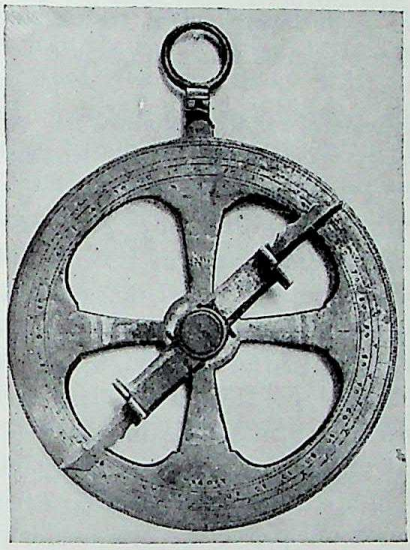


FIG. 73.—Champlains' astrolabe. (*Courtesy of Mr. S. V. Hoffman, New York.*)

during the closing Middle Ages; in fact they became symbolic of medieval science.

SHIPPING. Shipping was steadily expanded during the Middle Ages. Boats and large vessels had been used in Mediterranean areas long before the days of Homer, for Mediterranean commerce dates back at least to the Neolithic Age. During Greco-Roman days, ships became larger, speedier, and more luxurious. In northern Europe, however, they remained small, being thus especially adapted to the rougher waters of the Baltic Sea, the North Sea, the English Channel, and the Atlantic Ocean. The Vikings imitated Roman shipbuilders, but their ships were less pretentious. The bigger ones like the Gokstad Ship, discovered by archaeologists when investigating a Viking burial ground, were about seventy or eighty feet long, sixteen feet broad, and seven feet deep and carried one sail and thirty or more oarsmen. It was in such ships that the

Vikings sailed the treacherous ocean, discovered Greenland, and landed on the continent of North America.

The ships pictured in the famous Bayeux tapestry closely resembled the Viking ships but were more seaworthy and accommodated more men. Later ships carried fighting castles both forward and aft, a device necessitated by the constant danger of piratical attacks. An important innovation of the thirteenth century was the rudder attached to the stern. Fighting castles became permanent structures; the forecastle continued to be used for fighting purposes, while the aftercastle was converted into cabins for passengers and crew. Gradually, as ships became larger, they carried two and even three masts. Medieval shipbuilders developed great skill, producing ever larger ships, which finally in the days of Vasco de Gama, Columbus, and Magellan began to circumnavigate the globe.

Bows. Medieval warriors made constant use of the bow, an instrument of great antiquity used alike by the Romans and the so-called "barbarians" living north of the Roman boundary. The simple handbow was greatly modified in several ways. The first of these changes was introduced when the crossbow was invented, before the eleventh century. In a crossbow, the bow itself was attached horizontally to a piece of wood several feet in length. The bow, made of a thick shaft of wood, was strung with the aid of the feet, a trigger releasing the bowstring. Arrows discharged by this device traveled farther and more accurately than those from the simple handbow. So important were the crossbowmen that entire companies were organized. They supplemented the armed knights and wrought havoc among mounted adversaries, for their arrows could pierce the best armor of the day. By the fourteenth century, crossbows were charged by a crank, which drew the bowstring into position.

The English longbow was a remarkable invention. After Wales was conquered by Edward I, who ruled from 1272 to 1307, Welsh archers introduced into the English army speedily won a reputation for marksmanship. The longbow was 5 feet in length and was made from the wood of the yew tree, while the arrows were a yard long. The longbow had an advantage over the crossbow in that it could be strung at a moment's notice. The strings of the crossbow were always taut and became useless in rain, since they could not be easily protected. Nor was it possible to replace speedily a broken bowstring with a new one. On the field of Crécy (1346) the Genoese crossbow was useless because the bowstrings had so stretched from the rain that the arrows fell short of the mark. But the Welsh archers who arrived carrying longbows had kept their bowstrings dry. As the mounted knights clad in armor advanced over the rain-soaked freshly plowed field, the Welsh bowmen

killed many of them. Two further advantages that the longbow possessed were the greater rapidity with which it could be discharged and its greater force of impact. On one occasion an archer shot a shaft through a 4-inch oak door. Against such weapons, mounted and mailclad men were unable to maintain their ancient advantage.

ARTILLERY. Medieval military commanders possessed several types of fighting machines borrowed from Greco-Roman artillery. The simplest was the onager, a one-armed stone hurler. The arm, securely fastened at one end in a block of wood, was drawn back by pulley and rope. When released, the stone was thrown with great force against a wall. The two-armed ballista looked somewhat like a large crossbow. Two resilient pieces of wood were firmly attached to the machine. The string stretched between their free ends was drawn back by means of a windlass. Ballistae shot heavy arrows with tremendous velocity. Catapults were similar machines designed to hurl stones. The trebuchet was a more elaborate weapon that underwent considerable development in medieval times. It consisted of a long pole mounted on a support, the short end of which was loaded with a heavy stone, the long end carrying a much lighter stone. When released, the pole tipped up, hurling the lighter stone with great force over a long distance against the wall of a castle. The onager, ballista, and catapult were derived from ancient Greco-Roman times; the trebuchet owed its efficiency chiefly to medieval skill.

ARMOR. Medieval craftsmen displayed considerable ingenuity in perfecting armor. The Bayeux tapestry, woven soon after the close of the eleventh century, shows warriors wearing brimless helmets provided with nose guards. Their bodies are covered with hauberks, or byrnies, loose shirts extending to the knees, covering the arms to the elbow, and slit in front and behind to permit the wearer to ride horseback. Hauberks were reinforced with rings of metal or scales of leather, horn, or iron sewn upon the cloth or leather. Some were made of mail, woven links of metal.

Gradually, during the Middle Ages, armorers produced more effective and elaborate armor. During the thirteenth century, they greatly improved helmets. After 1300, plate armor supplanted chain mail, and by 1400, knights were completely incased in plates. One drawback was that suits of armor were so heavy that it often happened an unhorsed knight fell into the water and drowned. Most examples of plate armor on exhibition in public museums date from the close of the Middle Ages or from the sixteenth century. Many of these are tilting armor used in tournaments. Intended for gala occasions, they were handsomely made and carefully fitted. But the armor of the average soldier was a much plainer affair.

GUNS. The invention and perfecting of guns became significant factors in the life of Europe during the Middle Ages. We have learned that the Chinese invented gunpowder during Tang times. Sailors of the Byzantine navy used Greek fire, a combination of charcoal, saltpeter, and sulphur that burned vigorously under water. The first guns using gun-

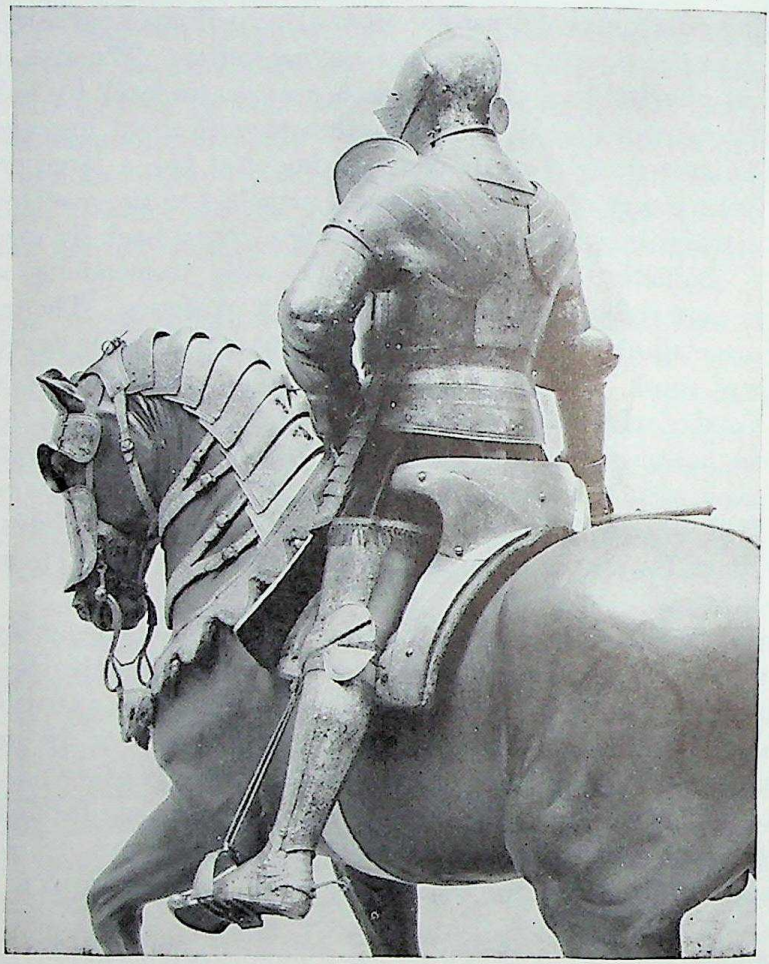


FIG. 74.—Medieval armor, about 1500. (*Courtesy of the Metropolitan Museum of Art.*)

powder, called "fire pots," were very inaccurate. The chronicler Froissart (*d.* 1410) states that cannon used in the earlier battles of the Hundred Years' War (1336–1453) made so much noise that the horses were frightened, which to him seemed more important than any destruction they caused.

Medieval smiths and armorers at first could not make accurate guns because they did not understand that the efficiency of a gun depends upon the closeness with which the ball fits into the barrel. At first,

cannon balls were made by masons from stone; European museums still have many examples of these. It was impossible to make them absolutely uniform in size. Nor were the first great guns made from single pieces of metal; strips of iron were so arranged as to form a barrel and were held together by hoops. Such guns were slow to manipulate and quite ineffective. But gradually artisans became more skillful so that, by the close of the Middle Ages, artillery had become sufficiently powerful to batter down the strongest castles. Guns carried by hand also improved in accuracy. These were manipulated by the ordinary men-at-arms and not by noblemen, who preferred to use swords. By 1500 the handgun was provided with a cock holding a match forcibly brought down to the primer by a trigger; such a gun was called a "matchlock."

The production of sufficient iron of the necessary quality for guns and armor was a problem. The earliest furnaces were simple contrivances, often little more than holes in the ground. A draft of air from a bellows forced into a heap of ore and charcoal produced a brisk fire but was not hot enough to smelt iron. Such primitive methods were improved when the Catalan forge, a stone structure, was invented in Catalonia. A draft of air was supplied by a bellows, the nozzle of which was thrust through an aperture leading to the base of the pit. The Catalan forge made possible a more powerful draft of air and a higher temperature. Invented before the time of Christ, it spread over the Roman Empire, a legacy to the Middle Ages. This type of furnace was repeatedly improved upon, especially toward the close of the Medieval Period. The "German furnace" was larger than earlier furnaces and employed elaborate bellows. In the largest establishments, the bellows sometimes was driven by a water wheel. The "Walloon furnace" apparently was another form of the German furnace. Blacksmiths' forges of the fourteenth and fifteenth centuries looked much like Catalan forges.

With more skillful methods of iron production and their application to the manufacture of large cannon as well as smaller handguns, a great revolution in military matters took place. The nobles, who once were safe from enemies behind the thick walls of their castles, lost their security and with it their military prestige. Further, a mailclad knight might be killed by a bullet from a harquebus or handgun carried by a baseborn infantryman. It is instructive to note that these inventions enabled princes to mobilize effective soldiers. Powerful armies increased the strength of kings, thus helping to establish the new royal absolutism that put an end to the Middle Ages. The wars of the sixteenth century between France and Spain for the control of Italy were the first conflicts in which guns and cannon played a decisive part. The invention of gunpowder and the manufacture of effective guns thus helped to put an end to the privileged position of the medieval nobility.

TIMEPIECES. Measurement of time has provoked man's interest from Neolithic and possibly even earlier days. We have long had such obvious divisions as day and night, the lunar month, and the year composed of twelve months. Sundials and hourglasses were common even before Greco-Roman times and remained in general use as late as 1800. The Greeks developed the clepsydra, or water clock; in this, water was placed in an earthern vessel and through holes in the bottom escaped at a definite rate. Some clepsydras were complicated; the one said to have been invented by Ctesibius of Alexandria had water wheels causing a small figure to rise and indicate the hour. Water clocks manufactured by the Arabs were widely employed in the Middle Ages until supplanted by mechanical timepieces.

The development of mechanical clocks is important in the history of civilization. Clockmaking, or the precise measurement of time, was a significant part of the training in mechanics of medieval craftsmen. A clock is an instrument that consists of a series of wheels driven by a spring or weight, equipped with a device that measures and indicates time. The modern clock is the product of a long mechanical evolution, dating in all probability from as early as the first quarter of the thirteenth century in Europe. The conquest of time measurement opened a whole new field of mathematical and scientific computation.

We have referred to the epochal importance of the invention of the sprocket, or toothed, wheel and have learned about its revolutionary effect on milling. Such wheels were also used from the beginning in the manufacture of clocks. The wheels, run by weights, were attached to ropes wound around the shaft of the main wheel. When, where, and by whom the clever device of the escapement that regulated the speed was invented remains unknown in spite of persistent research. The verge escapement and balance, perfected by 1400, are impossible to describe briefly and clearly; they must be seen to be understood. The best known clock employing all these improvements was built by Henry de Vick, about 1370, for the Palace of Justice in Paris, where it may still be seen. That this was a large clock one may infer from the 500-pound weights which set the main wheels in motion. When one considers that the parts were made by hand, this machine is a marvel of precision. There was much friction, however, because the parts did not fit perfectly, and hence it was not an accurate timepiece. Nevertheless, it used all the parts known to clockmakers during the next three centuries. Such clocks became increasingly popular; by the close of the Middle Ages, nearly every town of any size had a clock that marked the hours and struck them with a gong.

Some of the clocks of the later Middle Ages and the sixteenth century were very elaborate. Clockmakers were not able to improve the mecha-

nism or make it more precise; but they added astronomical devices, celestial globes indicating the positions of sun, moon, and stars. Clocks also had calendars showing eclipses and days of the week. These features may still be observed in the great clock in the Strasbourg cathedral. The clock in the Nuremberg market place has a succession of figures representing the emperor and electors of the Holy Roman Empire; that in Prague shows the twelve apostles. Such elaborate clocks, however, incorporate little or no essential mechanical improvement over De Vick's clock of about 1370.

A great innovation in the making of timepieces took place about 1500, when Peter Henlein of Nuremberg, a mechanic and probably an armorer, made a miniature clock, or, as we should call it, a watch. Because it was impossible for the wheels in watches to be run by weights, the motive force was supplied by coiled springs—a great mechanical novelty. Because Henlein's watches were oval in shape, they were called "Nuremberg eggs." They were imperfect timekeepers, for the balance worked only when the watch was carried in a vertical position. Moreover, the watch lost time as the spring became unwound. This defect was remedied about 1525 by a novel device called the "fusee," an invention by two Swiss watchmakers, Zech and Gruet. This clever device is a spiral cone-shaped pulley introduced between the spring and movement, giving the spring increased leverage as it unwinds so that a constant pressure on the watch movement results in accurate time.

Printing and Paper. Printing is undoubtedly the greatest of medieval inventions. Ever since the invention of writing, reading matter had had to be reproduced by hand. Numbers of scribes were employed in Athens, Alexandria, and Rome in copying literary masterpieces, a practice that continued throughout the Middle Ages. Books were so costly that few could afford them. Consequently, even in an age of investigation and development, opportunity to read and study remained limited. Parchment and vellum were employed during most of the Middle Ages; papyrus had gone out of use during the century before Charlemagne. It is certain that paper first came to Europe from the Arab world, which learned the secret of its manufacture from the Chinese, for it first appeared in those Mediterranean lands which were in constant touch with Mohammedan regions. It was made by grinding vegetable fiber to a pulp, which was then spread thinly and evenly over a board or cloth and pressed, forcing out the water and binding the fibers together into a compact mass. By the close of the Middle Ages, especially when printing became common, paper supplanted the use of parchment.

The origins of the art of printing are to be sought in China, whence it passed to western Europe. The steps in its evolution are obscure, but

it appears certain that block printing was practiced in the Rhine Valley early in the fifteenth century. In block printing an entire page was engraved, letters as well as pictures. It is obvious that this is very different from printing from movable type. To manufacture type, it was necessary first to produce type mold, after which it was possible to multiply letters infinitely. All the printer had to do was to arrange letters in words and set the text in frames.

The claim of Lourens Coster of Haarlem to the honor of having invented printing about 1440 is undoubtedly pure myth. Improvements in printing apparently are all associated with the shops of Mainz, that of Gutenberg contributing most to the evolution. His thirty-six-line Bible and Schöffer's and Faust's forty-two-line Bible, which appeared about 1455, mark the culmination of the invention of printing. The mechanical excellence of this printing is remarkable; in spite of innumerable later improvements in printing presses, it has never been exceeded.

No other medieval invention exerted such a profound influence as the invention of printing. Books became cheap; at least forty thousand editions were produced during the fifty years following. These books were bought by students and educated laymen who formerly had been denied the luxury of literary works; thus, printing was the most important mechanical art yet developed for the diffusion of thought. Like the invention of gunpowder, it marks the close of the Middle Ages and the beginning of a new era in intellectual history.

ENGINEERING. As engineers, our medieval ancestors exhibited much skill. Many of the dikes, dams, and canals of modern Holland and Belgium were constructed in medieval times. Some of the canals of the Lombard plain also date from this period. In the great Gothic cathedrals, we marvel at the skill that medieval engineers exhibited in raising such structures.

Leonardo da Vinci (*d.* 1519) was no doubt the greatest mechanical genius the world had yet produced. While he was first of all a great artist, his subtle mind studied everything with feverish restlessness. Scientific and mechanical things interested him profoundly. He deduced basic principles for machines, which he hurriedly jotted down in drawings and comment in his so-called *Notebooks*. He thought out models for spinning machines, flying machines, lathes, cannons and cannon carriages, fortresses, spiral gears, link chains, roller bearings, file cutters, screw cutters, improvements for printing presses, machines for the rolling of metal, stamping machines for making coins, and a large number of other mechanical devices. While many of these anticipated later inventions, it is difficult to determine how much influence Leonardo really exercised on the history of invention. It is certain, however, that in Florence and Milan he carefully observed all machines and mechanical operations, and

thus his mechanical studies are based upon the medieval machinery and tools that we have discussed above.

Medieval inventions were tremendously important in the history of technology. They sprang from the practical experience of our hard-working ancestors. The growing town life and ever expanding economic activity that had developed since the eleventh century naturally stimulated invention. Population increased steadily, serfs on estates became free tenant farmers, and the proportion of free handicraftsmen in the medieval population constantly grew. These are most important facts in the history of civilization, for they encouraged the mechanization of industry and provided the proper stimulus for invention. Progress in mechanical discovery was slow, however. But we must not belittle medieval machines even though as a rule they were crude and ineffective from the present-day point of view. Some machines like the printing press, for example, were surprisingly perfect by the end of the Middle Ages. For a long time, wood remained the chief material from which tools and machines were made, but iron was employed in ever greater quantity. Nevertheless, methods of producing this metal as well as copper remained primitive. Succeeding centuries, however, were to witness rapid progress in the mechanical arts. The impetus given in medieval times to invention and the mechanization of industry finally led to the extraordinary outburst of inventive skill during the eighteenth and nineteenth centuries.

FOR FURTHER READING

CARTER, T. F.: *The Invention of Printing and Its Spread Westward*
DE VINNE, T. L.: *The Invention of Printing*
ELMER, R. P.: *The Book of the Long Bow*
FFOULKES, C. J.: *Armour and Weapons*
———: *European Arms and Armour in the University of Oxford*
FORMAN, S. E.: *Stories of Useful Inventions*
GRAS, N. S. B.: *Industrial Revolution*
HAWKS, ELLISON: *The Romance of the Merchant Ship*
LAIRD CLOWES, G. S.: *Sailing Ships, Their History and Development*
MUMFORD, LEWIS: *Technics and Civilization*
NEUBURGER, ALBERT: *Technical Arts and Sciences of the Ancients*
RENARD, G.: *Life and Work in Prehistoric Times*
STONE, E. N.: *Roman Surveying Instruments*
USHER, A. P.: *A History of Mechanical Invention*

Chapter XXX

CENTRALIZED MONARCHY: END OF FEUDALISM

Every state is a community of some kind, and every community is established with a view to some good; for mankind always acts in order to obtain that which it thinks good.—Aristotle

AS IN Gothic art, scholastic philosophy and theology, literature, and education, the achievement of the Middle Ages in respect to government and political theory is a striking one—far more significant than many seem to think. The origins of modern states, not only European but even our own American government, are to be found in the Middle Ages. Some of our modern political theories were also born at that time. The best method of studying government, a method for which, in fact, there is no substitute, is to learn all one can about previous governments. Such study broadens one's understanding, widens his knowledge, and gives him a deeper appreciation of the many difficulties experienced by men living together and constituting a state.

Early Medieval Kings. Let us first consider the kind of government whereby the manorial society of the reign of Charlemagne (768–814) and Carolingian Europe was directed. This sort of political management, common in western and northern Europe during the centuries when society was predominantly agrarian, was characterized by a "rural economy." There was little trade; nearly everybody made his living by agriculture. Men were either serfs or seigniors; the former tilled the land that the latter owned and managed. Monasteries had vast estates managed by abbots and monks. The dioceses also owned many estates managed by the bishop and his chapter. This was an ancient method of living; some of its aspects can be traced through the Roman and Greek world back to ancient Egypt.

How did princes who ruled in a society so constituted make a living and rule their subjects? The term "prince" was applied to rulers, whether emperors, bishops, abbots, dukes, margraves, or counts. They had little or no money because there were few taxes. Kings like Charlemagne paid the expenses of their government out of their own pockets. This was possible only because the king was a great landlord owning a large number of manors, more than any other landlord in the kingdom. Charlemagne's manors, scattered all over his realm, supplied all his needs and those of his guests, including bishops, ambassadors from other

princes, and many officials, especially counts. There was a busy coming and going in his household. The visitors, fed and lodged by the king, often received handsome presents. The necessities were for the most part produced on the king's estates; it was thus natural to think of the royal manors as forming a part of the king's fisc, or treasury.

The king's household formed a roving group, for it was easier to move the palace and its personnel than to bring supplies from vast distances. This group, which managed the palace and was in charge of all details, was composed of prominent officials, assistants, and menials. The chancellor, who wrote documents and had charge of the royal correspondence, was usually a clerk or priest. The chamberlain managed the royal chambers. The butler and cellarer supervised the royal table. The constable (Latin, *comes stabuli*, or count of the stable) had charge of the royal stables. He was a very important official, for the royal family and its following required a great many horses. The marshal had charge of the royal stud; this, too, was an important position, for a new supply of horses could be secured only by breeding them. The chancellor, chamberlain, butler, cellarer, constable, and marshal were prominent also because they had direct access to the king; through them, strangers and subjects approached him. These officials therefore managed the king's business and settled public questions; in fact, they were officials of state. The capital of the kingdom was wherever the king was in residence.

During the first half of the Middle Ages, government was personal; princes themselves managed the business of state or at least supervised the men appointed to look after it. Hence, a ruler who directed his private estates, watched over their income, met ambassadors of other princes and entertained them, managed his household, supervised his government, held court, and whenever necessary went to battle was a very busy person. To do this work successfully, he had to be a healthy, vigorous, and powerful man. Furthermore, to be successful in the best sense, he had to have vision, ideals, and understanding. Charlemagne was such a person. The chronicler Eginhard gives us interesting details about his frugal habits and capacity for hard work. A lazy and incompetent person could hardly be successful in early feudal times.

Business of state included many items. Vassals had to be watched because they had duties to perform. If one of them died leaving a son who was not of age, the king had to take over the management of the fief during the minority. The question of the marriage of a vassal's daughters was equally important because the king could not afford to have them marry his enemies. In case of war, he had to marshal his vassals and their followers into some semblance of an army. Furthermore, it was his duty to sit in court over cases between his vassals, receive appeals from his vassal's vassals, if the latter had complaints against the former, and,

if necessary, call his vassals together and ask for aid or a special grant of money. Constant vigilance and vigorous supervision were the price of good government. Romantic pictures presented by the Arthurian stories give us a completely erroneous impression of feudal society as it actually existed.

We have an excellent description of an active medieval ruler in Mrs. J. R. Green's account of King Henry II of England, who ruled from 1154 to 1189.

> Henry was never at rest. It was only by the most arduous labor, by travel, by readiness of access to all men, by inexhaustible patience in weighing complaint and criticism that he learned how the law actually worked in the remotest corners of his land. He was scarcely ever a week in the same place; his life in England was spent in continual progresses from south to north, from east to west. The journeyings by rough trackways through "desert" and swamp and forest, through the bleak moorlands of the Pennine Hills, or the thickets and fens that choked the lower grounds, proved indeed a sore trial for the temper of his courtiers; and bitter were the complaints of the hardships that fell to the lot of the disorderly train that swept after the king, the army of secretaries and lawyers, the mail-clad knights and barons followed by their retainers, the archbishop and his household, bishops and abbots and judges and suitors, with the "actors, singers, dicers, confectioners, huxters, gamblers, buffoons, barbers, who diligently followed the court." Knights and barons and clerks, accustomed to the plenty and comfort of palace and castle, found themselves at the mercy of every freak of the king's marshals, who, on the least excuse would roughly thrust them out into the night from the miserable hut in which they sought shelter and cut loose their horses' halters, and whose hearts were hardly softened by bribes. They were often starved; if food was to be had at all, it was at the best stale fish, sour beer and wine, coarse black bread and meat scarcely eatable, even with the rough appetites of travelers of that age. Matters were made ten times worse by Henry's mode of traveling. "If the king has proclaimed that he intends to stop late in any place, you may be sure that he will start very early in the morning, and with his sudden haste destroy everyone's plans. It often happens that those who have let blood or have taken medicine are obliged at the hazard of their lives to follow. You will see men running about like mad, urging forward their pack horses, driving their wagons into one another, everything in confusion, as if hell had broken loose. Whereas, if the king has given out that he will start early in the morning, he will certainly change his mind and you may be sure he will snore till noon. You will see the pack horses dropping under their loads, wagons waiting, drivers nodding, tradesmen fretting, all grumbling at one another. Men hurry to ask the loose women and the liquor retailers who follow the court when the king will start; for these are the people who know most of the secrets of the court." Sometimes, on the other hand, when the din of the camp was silenced for a while in sleep, a sudden message from the royal lodging would again set all in commotion. A wild clatter of horsemen and footmen would fill the darkness. The stout pack horses, probably borrowed from a neighboring monastery to carry

the heavy rolls in which state business was chronicled, were hastily laden. Baggage of every kind was slung across the backs of horses or stowed into cumbrous two-wheeled wagons made of rough planks or of laths covered with twisted osiers, which had been seized from farmer or peasant for the king's journey. The forerunners pushed on in front to give notice of the king's arrival, and in the dim morning light the motley train of riders at last crowded along the narrow trackway, followed heavily by the wagons dragged by single file of horses, which too often foundered in the muddy hollows or half plunged into the torrents through rents and chasms in the low, narrow bridges that threatened at every instant to crumble away under the strain. . . . But at whatever inconvenience to his courtiers Henry carried out his own purposes and kept pace with the enormous mass of business that came to him. In all his hurried journeys we see busy royal clerks scribbling away at each halt charters, grants, letters patent and letters close, the king too fighting, riding, dictating, signing, sometimes dating his letters from three places on the same day. A traveling king such as this was well known to all his people. He was no constitutional fiction, but a living man; his character, his look and presence, his oaths and jests, his wrath, all were noted and talked over; the chroniclers who followed his court with their gossip and their graver news spread the knowledge of his doings.[1]

New Methods in Government. The new method of government evolved after the eleventh century is extremely significant. In those years were created some of the best and most permanent features of modern government. Rulers generally discarded the practice of having their public affairs managed by officials of their households. The functions of chamberlain, butler, marshal, and constable disappeared almost entirely. The chancellor remained and became more important. The duties of marshal and constable thenceforth were largely military. This new organization was "feudal," that is, adapted to the new feudal conditions in society and government which came into existence after the disintegration of the Carolingian state during the ninth and tenth centuries.

The Curia of Princes. Each feudal prince had numerous vassals bound to help him with their "advice" or "counsel" and to aid him in case of war. The greater nobles of the realm, and these included bishops and abbots, formed the king's council, or court (Latin, *curia regis*). This court was not in continuous session, nor were all vassals constantly in attendance upon the king. The *curia regis* was assembled wherever the king happened to be and was attended by such vassals as happened to be in the royal presence. It was an indefinite body, a constantly changing group. Dukes and counts also had such courts, at least if they were great princes; in such cases, they were called the duke's court (*curia ducis*) or count's court (*curia comitis*).

[1] Green, J. R., *Henry the Second*, pp. 63–66, Macmillan & Company, Ltd., London.

Functions of the *curia* were many and diverse. The *curia* took charge of problems that arose among vassals and between the prince and his vassals. In addition, it managed relations among other feudal princes. But a *curia* that was continually shifting in membership and moving from place to place could not well take care of the prince's business because vassals in occasional attendance could not be expected to be informed about all questions of government. Hence, the king relied more and more upon the advice and assistance of men who were constantly at court, who were more informed than the vassals who lived on their fiefs and rarely appeared at court. Thus a new *curia* came into existence, still called the *curia regis*, but to be regarded as the inner group of the larger, ancient *curia regis*.

Local Officials. There was no group of local government officials such as we have in every modern state; for manors were self-governing, and vassals managed their fiefs according to traditional customs. The activities of a prince did not extend to the manors of his vassals. The local representatives of the kings of France were called *prévôts* and were drawn from among the feudal lords and vassals of the crown. The chief defect of this system was that the *prévôts*, being feudal lords and having families to provide for, with sons to whom they wished to bequeath their fiefs and daughters to marry sons of other nobles, were not loyal and disinterested servants of the king. Instead of the royal interests they advanced their own. Philip II of France, who ruled from 1180 to 1223, therefore placed over the *prévôts* new officials called bailiffs whose duty was to watch the *prévôts* and check their acts. Of humble origin, bailiffs owed everything to him and were effective, loyal servants. Later, in the reign of Louis IX (1226–1270), a special group of *enquêteurs*, or inquirers, was in turn appointed to regulate the affairs of bailiffs. In this way did local government evolve in France before 1400.

Central Organs. Feudal kings found it burdensome to take with them on their wanderings all the officials of the government. This was especially true in the case of the more active rulers who watched affairs of state very closely and were overburdened by a constant increase of governmental business. It was desirable to have the treasury stationed at a fixed place so that men knew where they could go to make payments. This was especially true of the English government, for the English kings after William the Conqueror, who ruled from 1066 to 1087, were able administrators. They established their Exchequer first at Winchester and later at Westminster near London. The chief officials of the Exchequer were members of the *curia regis*, and even in our day the British Chancellor of the Exchequer is a member of the king's council, a direct descendant of the ancient *curia regis*. In France the *Chambre des Comptes* was the equivalent of the English Exchequer, and it too

was part of the *curia regis*. The *Chambre des Comptes* and the Exchequer were courts empowered to settle all sorts of questions in any way related to the financial administration of the realm.

JUSTICE. Much of a medieval prince's time was taken up with the personal business of justice. He heard all sorts of cases in the *curia regis*, if he had the time; if he had not, a committee of the *curia regis* was designated to try cases. In France the court, called the *Parlement*, soon became fixed in Paris. In England the King's Bench, established at Westminster, was also a department of the *curia regis* and dealt with questions arising between crown and subject. There were so many cases that justices of the court, known as itinerant justices, traveled about the country holding the King's Bench at different places at the same time. Soon after the establishment of the King's Bench came the Court of Common Pleas, also established in Westminster, which dealt with cases between subjects.

REPRESENTATION. Representation was a fixed principle in feudal government. Vassals, for example, had the right to give the king advice, and the latter had the right to demand their "counsel." In fact, it was absolutely necessary for the king to consult with them if he wished to get a special sum of money, or aid. Out of this early practice evolved the institution of the English Parliament, which has suggested representative methods to the governments of most modern countries, especially during the eighteenth and nineteenth centuries.

But representation in the Middle Ages, unlike that in recent times, was a matter of class, or estate. An estate is a social and political class united by special ties and separated from the rest of the population. Thus the first estate, the clergy, were the religious leaders of society but were also great landlords. The second estate, the nobility, were great landowners and constituted the aristocracy. A meeting of all the estates was called a *parliamentum*, or conference. This term has given its name to the English legislative body. Even today, the first estate, the clergy, and the second estate, the higher nobility, sit in the House of Lords, the upper of the two houses of Parliament. In France, however, the word *parlement* was applied only to the law court, which was a department or branch of the *curia regis*.

The third estate, composed of the new middle class of merchants and manufacturers, came into existence with the revival of trade and industry after the tenth century. These men lived in the towns that had sprung up in large numbers before 1300. When this class, commonly called the *bourgeoisie*, became wealthy and influential, it seemed desirable, especially when the king needed money, to call representatives from them to deliberate with him in a *parliamentum*. In this manner the English House of Commons came into existence by 1300. In France

the meeting of all the estates was called the Estates General and included representatives of the clergy and nobility as well as the bourgeoisie. This term, it is interesting to note, is still used in modern Holland to designate its parliament. In Spain, that is, in Castile and Aragon, a similar body was called the *Cortes*, a word derived from the Latin *curia*, again reminding us of the fact that medieval and modern parliaments evolved from the ancient *curia regis*.

Beginnings of Bureaucratic Government. Summary. There is one striking and fundamental difference between medieval and modern government. During Carolingian and early feudal days, princes made little attempt at administration, nor did they have many officials. To do its work effectively the modern state has developed large numbers of bureaus, or departments, each organized to deal with a special group of problems and provided with a large number of officials. Modern government therefore is "bureaucratic." The beginnings of bureaucratic government were made during the later Middle Ages, especially after 1200. Kings and other princes constantly increased their administrative activities and so needed an ever larger number of officials and departments of government. In England, for example, there were many "clerks" attached to the Exchequer, wardrobe, and king's chamber, Chancery, and the courts. Numerous special agents were required such as judges, ambassadors, castellans, coroners, justices of the peace, and so forth. They mark the beginnings of civil officialdom.

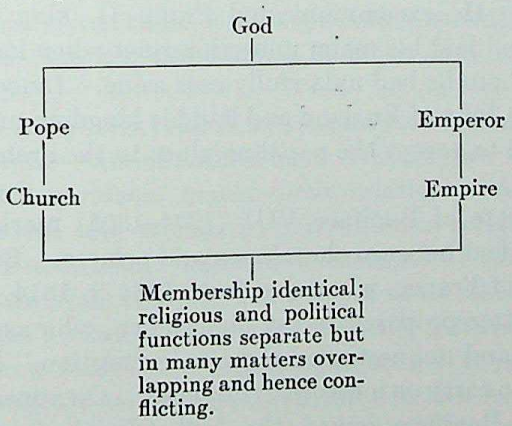
Such are a few of the chief features of medieval governments. Although there were many differences among individual states, these features are sufficiently similar to permit of certain generalizations. The study of English constitutional history is the best possible preparation for the study of politics in general. The government of the kingdom of Naples and Sicily is perhaps the best example of a medieval bureaucratic state. That of the duchy of Normandy is interesting because some of its features were borrowed by the kings of England. The county of Flanders is instructive because it was the government of a community that, for the most part, was industrial and commercial as early as 1200. Each state, whether kingdom, margraviate, duchy, county, or commune, possessed some political features that repay serious study.

The Holy Roman Empire. Probably no medieval state is more interesting than the Holy Roman Empire, but the history of this state is difficult to understand. One of man's most impressive political experiments, it constituted the medieval memory of the ancient Roman Empire. So tremendously important had that empire been, that men could not conceive of a world without a world-wide empire. They looked back upon the Roman Empire as a utopia and yearned to recapture its steadying influence. Charlemagne thought that he revived it in 800,

Otto I likewise in 962; thus, throughout the entire Middle Ages and down to the year 1806 there was at least the shadow of a Roman Empire in Europe. Although very different from the ancient empire, it satisfied the yearning for an institution in which all men should live together in peace and happiness.

Throughout the Middle Ages, it was taught that all government was instituted by God. St. Augustine held that government was established in order to check violence; Thomas Aquinas insisted that, in addition to repressing violence, government should advance human welfare as well, following the opinion of Aristotle. This was also a Christian idea, as we learn from the New Testament (Romans 13). Medieval thinkers on political problems taught in general that the Empire was established by God to check violence and bring peace. An empire, in theory, at least, was to embrace all the peoples of the earth. This idea remained little more than theory, for such princes as the kings of France and England never recognized the Empire as superior to themselves. Nevertheless, it was a magnificent theory and one of the noblest ever evolved by man, who finds the maintenance of peace and the pursuit of happiness in a political society a difficult and often disappointing task.

By the side of the Empire so instituted, God had established his church for the salvation of mankind. St. Peter and his successors, the popes at Rome, were Christ's vicars. As the Empire had highest authority over man's political activity, so the church possessed complete control over his religious welfare. To comprehend this idea, one should remember that all men were regarded as being at the same time subjects of the Empire and members of the church. Citizenship in the Empire was in theory the same as that in the church. The following diagram may help to explain this conception:



This remarkable theory satisfied theologians, moralists, and philosophers. But it was difficult to determine in practice where the authority

of the church ended and that of princes began. Theoretically, matters pertaining to religion were in the hands of the church, those purely secular subject to the state. Administration of the sacraments, teaching the truths of religion, management of churches, and appointment of priests to clerical posts belonged to the church. On the other hand, such purely nonreligious matters as making roads, building bridges, forming departments of government, and the organization of markets, armies, and navies belonged to the state.

But there were many functions that were religious as well as political. Many political acts had a religious import, and such religious or moral aspects were subject to priestly action. For example, when Henry IV, emperor from 1056 to 1106, refused to discontinue lay investiture and persisted in practicing simony, Pope Gregory VII excommunicated him (see also pages 402 to 403). Excommunication constituted a serious situation for a ruler because all oaths to which he was party became null and void; thus, a feudal prince—and all medieval princes were feudal—found his vassals suddenly freed from obligations bound by oaths of vassalage. Further, popes and princes quarreled about such questions as control over the priesthood, taxation of the clergy, divorce, and the plundering of religious property.

There were many contests between princes and popes, only a few of which can be mentioned here. The long struggle of Henry IV and Gregory VII, Pope from 1073 to 1085, over investiture and simony resulted in prolonged conflict and the penning of countless documents propounding the theory of the relation between church and state. Under Innocent III, Pope from 1198 to 1216, the papal power reached its highest development. In his desire to see justice accomplished everywhere, this Pope assumed a determined attitude on all questions in which the church was interested. He excommunicated Philip II, king of France from 1180 to 1225, and laid his realm under interdict when he refused to take back his wife whom he had unlawfully cast aside. Innocent also excommunicated King John of England and laid his kingdom under an interdict when he refused to accept the papal nominee to the archiepiscopal see of Canterbury.

The pontificate of Boniface VIII (1294–1303) marks an important stage in this conflict between churchmen and princes. Boniface's quarrel with Philip IV of France, who ruled from 1285 to 1314, grew out of the fact that the latter proposed to tax churchmen, who asserted that they had an ancient and unquestioned right to exemption. Philip, however, wanted money to carry on a war with England. On appeal by some of the French clergy, Boniface issued the bull *Clericis laicos* in 1296. It forbade, under pain of excommunication, the payment of any tax by a

churchman to any prince. A quarrel ensued in which the undoubted rights of Boniface were contested by Philip, who wished to act in accord with his political interests. Six years later a second quarrel broke out between the two, begun when Philip thrust a bishop into prison. Thereupon Boniface issued the bull *Unam sanctam* in 1302, one of the most instructive of medieval political documents, presenting the old teaching about the nature of state and church, the relation between the two, and the respective authority of each.

The difficulties over which popes and princes contended may seem trivial. The Feudal Age and its intricate overlapping of powers are gone and with them has vanished the possibility of the church's clashing with the state over many questions. The problem cannot be dismissed so simply, however. To what extent are moral considerations to control political action? May a state assume full control over morals? Since religion provides the foundation of morals for many people, may a state control and dictate religion as well as morals? In recent years a number of states have sought to do so. Russia has taken upon itself the right to interpret the truth of religious doctrine as it sees fit. Hitler has tried to revamp the Christian religion in Germany. In both cases the age-old idea that the state is not competent to judge in matters affecting religion and morals has been violated and with consequences dangerous to fundamental liberties.

Law. Medieval civilization, as we have shown in the preceding chapters, was profoundly influenced by the Christian faith. Indeed, this entire culture could not have come into existence without it. In the eyes of scholastic philosophers the purpose of the state was moral; its duty was to maintain a moral order by the establishment of "justice." This resulted in a general "equality" for dwellers in a state. Hence, justice and equality were the purpose of all law whether constituted by manorial customs, feudal customs, the English common law, or the statutes of communes.

These ideas are closely related to another conception universally held in the Middle Ages—that of natural law. Natural law is that part of the moral law which regulates man's social relations. As God rules the universe, his divine law extends to every human relation. These relations are based upon the fundamental concepts of Christian morality, which include the prohibition of doing any evil to others. The opening words of Gratian's work on canon law identify natural law with Jesus, words in Matthew 7:12: " . . . all things whatsoever ye would that men should do to you, do ye even so to them: for this is the law and the prophets." Natural law, as interpreted in the Middle Ages, then, was the precept of Christian morality and, when applied, produced "justice"

and "equality." All law, whether statutes or customs, must harmonize with natural law. Law might not violate man's rights; if it did, law became unlawful and even tyrannical.

From these ideas, it followed that a prince must rule in accordance with the principles of morality; his government might not run counter to the natural rights of his subjects. If it did, he became a "tyrant" and medieval lawyers, philosophers, and theologians held that subjects had a right to depose such a ruler, even by violent means if necessary. The prince was merely the guardian of law; he did not stand above it.

Of course, these principles were not always carried out; medieval society never fully realized this happy ideal. Every reader of history knows that under feudal conditions there were violence and injustice. But ideals nevertheless are important and give character and purpose to civilization. Dr. A. J. Carlyle, an acute student of medieval politics, makes the following statement about the significance of feudal ideals of government:

> In a very real sense we might say that it was this [principle that the prince functions under the law], together with the principle of equality, which more than any other has really distinguished the political civilization of the modern world from that of the ancient [Roman] Empire, and that all the other characteristic principles of modern civilization are ultimately derived from it. The tendency of the continental countries of Europe in the seventeenth and eighteenth centuries to conceive of the king as being over the law and the sole source of law, whatever may have been its historical origin and explanation, was nothing but a relapse into a less developed conception of the political order.

The influence of Roman law upon medieval political theory is interesting because it illustrates how ideas arising in one cultural complex continue to influence the thought and action of a very different age. Roman law had been developed in a society over which rulers kept the control of political activity in their own hands; they jealously guarded coinage, the administering of justice, military affairs, and the issuing of decrees. In other words, they had full control over an absolute government. During medieval times, however, princes were feudal, hence exercised far less control over state and society than did the emperors of Rome. Their vassals in many cases struck their own coins, administered justice, made war when it pleased them, and managed feudal estates regardless of the wishes of the overlord. Such a condition often produced anarchy, which medieval princes tried to prevent by extending their power at the expense of feudal inferiors. Through vigorous supervision, they were successful in building up strong monarchial states. Moreover, the ancient Roman law provided them with practical examples whereby they might become absolute rulers. Frederick Barbarossa, Emperor of the Holy Roman Empire from 1152 to 1190, his grandson

Frederick II, Emperor from 1212 to 1250, and Philip IV, who ruled France from 1280 to 1314, are noteworthy examples of princes whose political absolutism was shaped in part by the principles of Roman law.

Divine Right of Kings. The teaching that kings ruled by divine right, directly by the grace and will of God, made its appearance during the last centuries of the Middle Ages. This theory of absolute government, usually misunderstood in recent times, exercised great influence in the creation of such modern autocrats as Louis XIV of France. According to the earlier medieval theory the emperor derived his authority from God. But kings like those of England and France refused to recognize the headship of the emperor, arguing that they too, recognizing no superior princes on earth, received their authority from God. This hypothesis proved useful during the closing Middle Ages because it gave rulers a theoretical right based upon God's majesty to rule over vassals and bring them to the bar of justice, thereby sapping the foundations of feudalism.

In its practical as well as its theoretical aspects, medieval political activity may teach wholesome lessons about the art of living in political communities. Such living together cannot be avoided; for as Aristotle taught and as scholastic philosophers maintained, man by nature is a political creature. On the practical side, medieval political activity was as fruitful in results as was that of the Greeks and Romans. Development of local and central governments throughout medieval Europe was in itself an achievement as significant as the creation of the Greek city-state or the Roman Empire. But it is in its theoretical aspects that medieval political energy is particularly instructive. Thinkers of that time realized that no government can long be successful in the management of practical matters without at the same time subsuming an adequate theoretical or metaphysical basis upon which to proceed. Morality must be regarded as an unalterably binding principle in political life. The natural rights of citizens must never be infringed. Justice is the main function of states; it is not a matter of temporary political convenience but consists in the application of eternally valid principles. This ideal mankind probably never will be able to translate into practice. During medieval times, when such conceptions were generally embraced, men made unrighteous wars and committed political injustices. Nevertheless, rulers like Louis IX of France sought to be guided by such ideas. In modern times, particularly after the days of Machiavelli, rulers flouted the idea that the acts of states are subject to the principles of morality applicable to private life. This view, which has brought great misfortunes upon modern society, is open to serious objection. Placing governments above morality makes justice difficult if not impossible; in the long run, it may even destroy these same governments.

From the above, it is obvious that medieval conceptions have much to teach the modern world. Their realization should enable us to put forth our most effective efforts to solve political problems in the present industrial age, so torn with bitter dissensions.

FOR FURTHER READING

ADAMS, G. B.: *The Growth of the French Nation*
BATESON, MARY: *Mediaeval England*, 1066–1350
BERTRAND, LOUIS, and CHARLES PETRIE: *The History of Spain*, 711–1931
BRYCE, JAMES: *The Holy Roman Empire*
CHAYTOR, H. J.: *History of Aragon and Catalonia*
COLLINS, R. W.: *A History of Mediaeval Civilization in Europe*, Chaps. V, XVII–XIX, XXXIII, and XXXIV
EGINHARD: *Life of Charlemagne*
FIGGIS, J. N.: *Divine Rights of Kings*
———: *From Gerson to Grotius*
KNOX, WINIFRED: *The Court of a Saint*
MCILWAIN, C. H.: *The Growth of Political Thought in the West*
MURRAY, R. H.: *The History of Political Science from Plato to the Present Time*, Chaps. II and III
SEDGWICK, H. D.: *Italy in the Thirteenth Century*
SMITH, A. L.: *Church and State in the Middle Ages*
THOMPSON, J. W., and E. N. JOHNSON: *An Introduction to Mediaeval Europe*, 300–1500, Chaps. XXV–XXVIII
TILLEY, ARTHUR (ed.): *Mediaeval France*, Chaps. II and III
TOUT, T. F.: *The Empire and the Papacy*
"The English Civil Service in the Fourteenth Century," *The Collected Papers of Thomas Frederick Tout*, Vol. III, pp. 191–221
WAUGH, W. T.: *A History of Europe from* 1378 *to* 1498
WOOLF, C. N. S.: *Bartolus of Sassoferrato*

Chapter XXXI

CULTURE AT THE CLOSE OF THE MIDDLE AGES

The roots of modern society run deep down into mediaeval history. Mediaeval history is the heritage of the modern age. It ought not to be alien to us.—J. W. Thompson

THE preceding eight chapters have recounted some of the more significant achievements of medieval civilization. Late medieval agriculture and feudalism, industry and commerce, town and manor, scholarship and educational institutions, languages, literature, and art, government and political conceptions, and, above all, church and religion constitute a remarkable culture. But changes were setting in that brought about profound modifications. In this chapter, we shall sketch the chief features of this changing culture during the fourteenth and fifteenth centuries.

Social Changes. Viewed superficially, society had not changed much by 1400. The population remained agricultural. The nobility, who constituted a powerful class politically, still were dependent upon the peasantry. The clergy were numerous and owned much real property. Peasant, noble, and clergy were regarded as the traditional classes of society. This was a narrow view, but it was easier to see things as they were represented as being than as they really were. Anyone could note, if he but kept his eyes open, that this age-old classification no longer fitted the situation. Everywhere there was a powerful and ambitious middle class—the townsmen, or *bourgeoisie*. In Flanders, Holland, and Milan they amounted to more than half the population. But people were blind to social changes and did not properly analyze the new forces of capitalism, which were rapidly gaining ground.

The nobility fancied themselves secure, although they had no good reason to think so. The townsman with his nimble financial methods was steadily getting richer; noblemen became ever poorer. Sooner or later the townsmen they despised would demand a share in the management of the country. Some noblemen turned to business and made handsome profits, but the rank and file clung to their old ways of living. They objected to the fact that kings chose businessmen as councilors, as did Charles VII of France when he selected Jacques Coeur, a wealthy merchant of Bourges, to be his financial adviser. They resented the inter-

ference of the king with their law courts. They hated the baseborn infantryman who fought with crossbow or with guns, which were becoming more and more accurate, and whose cannon were able to batter down castle walls. But most of them confidently believed that the future would be much like the past and felt perfectly secure.

The nobility admired the feudal romances. *Amadis of Gaul* was read by all. A Portuguese romance of the fifteenth century, it deals with the adventures of Amadis, who, as a baby set adrift in a boat, was carried to the Scottish coast and arrived at the court of his aunt. His brothers Floreston and Galaor, from whom he had been early parted and who did not know him, chanced to visit the court. The three have adventures of a highly romantic nature characteristically dear to the decaying chivalry of the closing Middle Ages. The romances of King Arthur had an even greater vogue. Sir Thomas Malory (*d.* 1471), an Englishman, brought them together in an account known as the *Morte d'Arthur*. It deals with the virtues of King Arthur, the faithlessness of Queen Guinevere, Lancelot's love for her and his consequent failure to discover the Holy Grail, Galahad finding it because of the purity of his heart, and Guinevere becoming a nun and Lancelot a hermit.

New and model chivalric orders were founded to give expression to this idealism. The most famous was the Order of the Golden Fleece, founded in 1430 by Duke Philip the Good of Burgundy, ruler of the Low Countries. Of the other orders the best known was the Order of the Garter, created by Edward III, who ruled England from 1327 to 1377; the chronicler Froissart (*d.* 1410) gives the following account of its inception:

> In this season the king of England took pleasure to new re-edify the castle of Windsor, the which was begun by King Arthur, and there began the Table Round, whereby sprang the fame of so many noble knights throughout all the world. Then King Edward determined to make an order and a brotherhood of a certain number of knights, and to be called knights of the Blue Garter, and a feast to be kept yearly at Windsor on St. George's Day [Apr. 23]. And to begin this order the king assembled together earls, lords, and knights of his realm, and shewed them his intention; and they all joyously agreed to his pleasure, because they saw it was a thing much honorable and whereby great amity and love should grow and increase. Then was there chosen out a certain number of the valiantest men of the realm, and they swore and sealed to maintain the ordinances, such as were devised; and the king made a chapel in the castle of Windsor, of St. George, and established certain canons there to serve God, and endowed them with fair rent. Then the king sent to publish this feast by heralds into France, Scotland, Burgundy, Hainault, Flanders, Brabant, and into the empire of Germany, giving to every knight and squire that would come to the said feast fifteen days safe-conduct before the feast and after, the which feast to begin at Windsor on St. George's Day next after in the year of our Lord 1344, and the queen to be there

accompanied with three hundred ladies and damsels, all of noble lineage and appareled accordingly.

Chivalric ideals thus still permeated society, but times were changing rapidly. The civil wars in France under Louis XI (1461–1483), the Wars of the Roses in England (1455–1485), and similar quarrels in other parts of Europe seemed to give the lie to such ideals. The brutality that accompanied these wars caused men to look back upon a happy Utopia when knights were good, gentle, honorable, and just. No wonder that Malory's *Morte d'Arthur* was popular! Lamenting the decline of chivalry and urging men to emulate the example of past heroes, William Caxton, the English printer (*d.* 1491), wrote *The Book of the Order of Chivalry*, in which the following exhortation occurs:

> O ye knights of England, where is the custome and usage of noble chivalry that was used in those days? What do ye now but go the the baynes [baths] and play at dice? And some not well advised use not honest and good rule against all order of knighthood. Leave this, leave it, and read the noble volumes of Saint Graal, of Lancelot, of Galahad, of Tristram, of Perseforest, of Percival, of Gawayn, and many more. There shall ye see manhood curtesy and gentleness. And look in latter days of the noble actes with the conquest as in King Richard's days Coeur de Lion, Edward the First and the third and his noble sons, Sire Robert Knolles, Sir John Hawkwood, Sir John Chaundos, and Sir Walter de Manny. Read Froissart.

The Bourgeoisie. Year by year, townsmen were becoming more important. They had money and controlled the country's business—kings and princes turned to them in order to finance their wars—and many a burgher of low birth rose to high position. Townsmen read the knightly romances with pleasure and tried to ape the manners of the nobility. The Medici rulers of Florence, who began as humble merchants, adopted the luxurious living of nobles and enjoyed hunting, a sport that was the prerogative of noblemen. Many a successful English merchant was knighted and even admitted to the peerage. Bourgeois families became proud and exclusive. The Paduan Capulets and Montagues in Shakespeare's *Romeo and Juliet* were as haughty and jealous and prone to fight as noblemen. The wealthy Pazzi and Medici families of Florence and the Fugger, Welzer, and Hochstätter families of Germany were typically aristocratic in their manners and habits. In fact, during the closing Middle Ages an aristocracy of wealth was steadily increasing and transforming society.

The Clergy. The clergy were more numerous than at any previous time during the Middle Ages. Particularly was this true of the regular clergy, especially the mendicant orders of Dominicans and Franciscans. The clergy remained conservative and slowly changed with the times.

Parish priests learned to read and write and mastered sufficiently the rudiments of theology to teach the elements of religion and administer the sacraments. Their education was practical; that is, it enabled them to perform their duties but did not help them to understand the more fundamental problems of religion and theology. There were instances of priests who could scarcely read Latin. Such ignorance is not surprising in view of the fact that, as a rule, priests were "presented" by noblemen to bishops who appointed them without much examination into their intellectual fitness. Sometimes their moral character also was not sufficiently examined. Thus Desiderius Erasmus (*d.* 1536) commented approvingly when the bishop of Utrecht rejected 297 out of 300 candidates for clerical posts.

One might expect bishops to be better prepared for their offices, but many also owed their election to the influence of princes. Sometimes bishops were younger sons of counts or dukes. Many a prelate, trained in law, was poorly acquainted with the Bible and other documents of the Christian religion. One such was the bishop of Lausanne in Switzerland, an illegitimate son of the count of Savoy. When asked by the clergy in Bern to help them in a debate (1528) with Zwingli and other reformers, he begged to be excused "because he was not learned in Scripture." Fortunately, not all priests and bishops were unfit. There were many good priests who served their flocks well. Chaucer, for example, portrays a good priest who taught his parishioners the truths of the Christian religion, set an example of Christian living by irreproachable conduct, and stood ready to help the poor and comfort the sick. One of the best of bishops was Nicholas Cusanus, who had charge of the see of Bressanone from 1450 to 1464. He was zealous, clearly saw his duty, and made firm efforts to reform the religious life of his diocese.

Difficulties Confronting the Church. Clerical ignorance and incompetency were serious defects in the church and emphasized a growing difficulty in relation to the laity. The education of many laymen at the end of the Middle Ages was as good as or better than that of most of the clergy. Some laymen learned Greek and Latin. They began to criticize the shortcomings of priests and bishops. The fact that they exaggerated gained many readers for them. The church feared that the clergy might so lose the respect of the laity that they no longer could be leaders in the cultural life of the time. But how could the church remedy these blemishes when noblemen nominated parish priests and princes appointed bishops?

Another problem facing the church was a growing sense of patriotism. The relations of the church with powerful princes were becoming ever more difficult. Princes were successfully managing their states and taking authority from feudal nobles and town governments and even

from the churchmen who were princes. Townsmen were enthusiastic in the support of their rulers. When the Hundred Years' War (1336–1453) and the Wars of the Roses (1455–1485) disrupted trade and damaged prosperity, the townsmen looked to them to bring order out of confusion. Small wonder that nationalism, which became a powerful sentiment after 1300, was a threat to the sway of the church over the souls of men. There was serious danger that the church might be parceled out among the states because of the new national philosophy.

The gravest crisis in the history of the church during this time arose with the Avignonese papacy, so named because the popes had their residence at Avignon in France from 1309 to 1377. They found it unsafe to live in Rome or even in Italy because of the violence of nobles and townsmen. The college of cardinals contained members of French nationality, French influence was strong, and consequently Clement V, (Pope from 1305 to 1314) and himself a Frenchman, took up his residence at Avignon, as did his six French successors. They were not lacking in ability, but the fact that they were Frenchmen made them disliked and suspected by Englishmen, Germans, and others. Under the cross fire of envy and jealousy, nationalism threatened to break up the unity of the church.

The career of John Wycliffe (*d.* 1384), a priest born in Yorkshire, provides a good example of the difficulties confronting the church at this moment. He studied at Oxford, became master of Balliol College, and as warden of Canterbury Hall acquired a reputation for his quarrels with friars and other churchmen. He gave expression to local and national feelings about the abuses and practical shortcomings of the clergy and papacy and the claims of popes. Times were hard in England because the wealth of the country had been consumed in the fruitless Hundred Years' War. Further, the English believed rightly or wrongly that the Avignonese popes were kept under the thumb of the king of France. Why should the papacy draw moneys from England to be spent in France, a country that was her national enemy? During the thirteenth century the popes had received an annual sum of money (£666) from the English crown, in accordance with a promise made by King John in 1215 to Pope Innocent III. Its payment had been discontinued in 1290; and when a request for renewal was made in 1366, Wycliffe wrote an argument against this.

Such was the beginning of his active anticlerical career. One of his many pamphlets stated that no prince or Pope had a right to rule unless he conducted himself in accordance with the law of God as laid down in the Gospels and according to canon law. He argued that, as unforgiven mortal sin in the sight of God vitiates everything man does, so also does it render null and void the right of a prince or Pope to rule. God is the

source of all authority; and if a ruler, whether spiritual or temporal, is not in a state of grace, the feudal obligation of obedience comes to an end. All governmental authority depends upon "grace." This was the kind of theory that might be used equally well by a king to disown the moral and religious superiority of Pope and church and provide an excuse to seize church lands.

Was the church really the church founded by Christ, possessing unique authority in respect to faith and morals? Wycliffe, seeing corruption and abuses, argued that it was not. The true church, according to Wycliffe, is the church of those predestined to be saved. It is a purely mystical body; it has little or no relation with the visible earthly organ of the church of Rome. The Pope is an honorary president at the most; he does not possess the power of the keys. Further, he has no political superiority over kings and princes, for popes may not exercise political authority. Kings, on the other hand, may correct churchmen, regulate their lives, and even take from them ecclesiastical property. Finally, Wycliffe denied the doctrine of transubstantiation. These were frontal attacks against the doctrines and discipline of the church upon which its power and position had been founded.

Another crisis arose when in 1378, the year after the popes abandoned their residence at Avignon, Pope Gregory XI died. The cardinals could not agree and elected two rival popes, each claiming to be the successor of Peter and vicar of Christ's church. Urban VI was supported by the numerous cardinals who resented French influence in the papal Curia. Thereupon the French cardinals elected Clement VII. France, Spain, and Naples supported Clement while the political enemies of France, that is, England and Germany, as well as the people of northern Italy recognized Urban. Each Pope excommunicated the other—a grievous scandal, for the church had always taught that it was indivisible and that in matters of faith and morals it could not err. Now this indivisible church, which for generations had comforted humanity, was split in two, mainly for political reasons.

How was the scandal, known as the Western Schism, to be ended? Some brought forward the theory that the schism might be healed by a council. Each Pope, however, argued that he was Christ's vicar appointed to rule over Christ's church and no one, not even a council, could remove him. But the party advocating the "conciliar theory" held that in dire necessity, as in the present crisis, a council representing the entire church had authority in respect to faith and morals even above popes. This theory was revolutionary, for during the preceding centuries the popes had usually been regarded as having the highest authority in the church. The conciliar theory now proposed to substitute a representative body for papal authority. The great danger of such parliamen-

tary control was that national rivalries, which had caused the Western Schism, might work greater disunity in the church than ever before.

Notwithstanding such objections a number of councils were held, that of Constance, which lasted from 1414 to 1418, being the most significant. The council deposed the reigning popes and elected Martin V, putting an end to the schism. It also took steps to suppress a dangerous heresy that had arisen in Bohemia under the leadership of John Huss. Further, it gave some attention to reforms, but an effective program was impossible to carry out because of the influence of princes and noblemen. Also, many churchmen naturally disliked reforms that affected their pocketbooks, and the princes sympathized with and supported them. The Council of Constance also issued two decrees, *Sacrosanct* and *Frequens*, which fixed the theoretical basis of councils. The former declared that a council representing the entire church held power immediately of Christ and that it had supreme authority even over the Pope in matters pertaining to faith and morals. The second provided for the periodic meeting of a council, the first after a lapse of 5 years, a second after 7 years, and thereafter one every 10 years.

The Council of Basel, from 1431 to 1449, although principally occupied with reforms, accomplished little because of hostile political forces. Councils were thought to be dangerous; they were unwieldy and, because representatives of all national groups sat in them, held the possibility of another schism. Sincerely religious, the people of Europe wished to preserve at all costs the unity of the ancient church and saw in the Pope one who could maintain unity amid conflicting national interests. Pope Pius II therefore issued the bull *Execrabilis* (1460), which condemned appeals to councils and forbade any person to make such appeals. This bull put an end to any further attempts to create a parliamentary government in the church and reestablished papal authority. Reform was abandoned for the moment; this was unfortunate, for during the next century in the days of Martin Luther and John Calvin the accumulated abuses in the church gave rise to demands that led to the Reformation. But the unity of the church was preserved, at least for the moment.

Economic Theory. While such dangers threatened the sway and the organization of the church, religion continued to provide the ethical basis of economic theory. Just as law, to be valid, had to conform with the principles of natural law, so also must economic theory conform with Christian ethics. It was the duty of state and society to establish justice. which involved the idea that all men, from the point of view of ethics at least, were equal. There must be justice in every exchange so that buyer and seller alike might gain. Hence, there might be no fraud in any transaction. This idea applied also to labor; a worker should receive all he earned. Capital invested had to be returned, for this was "just."

This principle, in part at least, is applied today in some of the profit-sharing factories of the United States. Under this plan, profits are divided among workers after wages, depreciation, and borrowed capital with interest are deducted. The manager receives a "wage," but he does not appropriate the profits of the business.

Moneylending was severely criticized, for lenders were often tempted to take advantage of borrowers. Medieval philosophers and theologians argued that in lending money the principle of justice should be preserved. The lender should have his money at the end of a stipulated time plus a small sum to cover risk, a fine in case of failure to repay promptly, and compensation to the lender who lost a chance to make money in another business. There was to be no charge for the use of the money itself. Such charge, called "usury," was regarded as contrary to the principle of justice.

A "just price," to be demanded for all goods and services, was one that conformed with the principle of justice and left both parties to the transaction "equals." In general, it was held that the just price consisted of the original cost of the goods to which had been added the cost of manufacture and a small profit for the maker. The cost of manufacture and the amount of profit were to be sufficient to enable workers to maintain a decent way of living. Forestalling, engrossing, and regrating were prohibited because they resulted in prices that were not just. Such ideas were enforced more or less successfully in medieval towns, which, as compared with our own, were small. But there was much evasion, as is proved by the fact that popular preachers often sharply chided usurers, forestallers, and regraters. Forbidden economic practices, regarded as constituting an ethical offense, frequently were disclosed in the confessional.

Art. The associated arts of sculpture, stained glass for churches, and painting were all in the service of religion. Gothic art still flourished, and sculptors were busy as never before. Painting evolved rapidly after 1300; the themes were still chiefly religious—the Annunciation, Nativity, flight into Egypt, Massacre of the Innocents, Christ teaching in the Temple, baptism of Jesus, Crucifixion, Resurrection, Ascension, stoning of St. Stephen, martyrdom of St. Lawrence, to mention but a few. Every point in Christian teaching and every pious story were depicted in color or carved in stone. We have a multitude of artistic objects dating from the later Middle Ages; they speak eloquently of a time when religion was a chief inspiration in art.

The Somber View of Life. How did the average person of the later Middle Ages view life? We must bear in mind that life was shorter than it is today because of the prevailing ignorance about disease, especially infections. Disease was mysterious and might strike anyone. There

were terrible plagues—the Black Death, the sweating sickness, and the ordinary plague. Erysipelas, diphtheria, scarlet fever, leprosy, and smallpox were common. Infant mortality was high, and older people died of diseases that today are rarely contracted and that are readily cured. All this was natural when preventive medicine had not yet come into existence and when sanitary engineering was unknown. This life was brief, people said; but they knew that some time in the future would dawn the Day of Judgment, when the graves would yield their dead and all men would be judged by Christ. The jaws of hell yawned for the wicked; heaven awaited the righteous. The theme of the Last Judgment

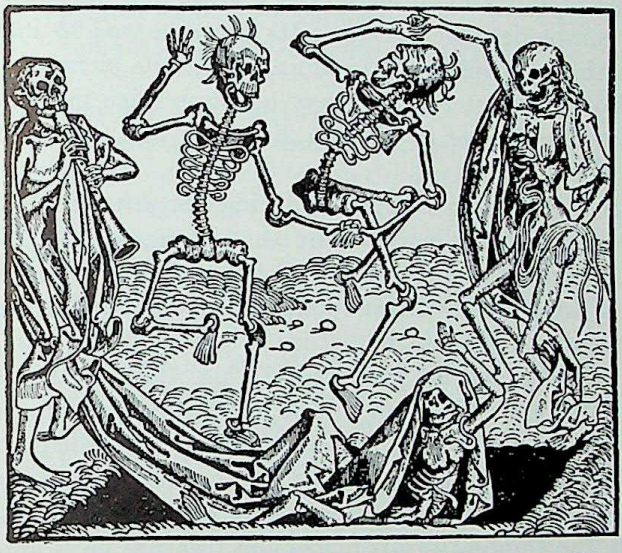


FIG. 75.—Woodcut, late medieval "Dance of Death." (*Courtesy of Harper & Brothers, publishers.*)

became popular, and painters made many representations of it. A few of the more famous of these are Rogier van der Weyden's in the hospital in Beaune in Burgundy, Fra Angelico's in Florence, and Michelangelo's in the Sistine Chapel in Rome.

The brevity of life, its catastrophes, and its place in the dramatic scheme of creation tended to make men pessimistic about the affairs of this life and gave rise to a great theme in art—the dance of death. Dead forms in various degrees of decomposition lead popes, cardinals, bishops, princes, knights, merchants, and laborers in a dance. There are many variations on this theme, the accompanying example, which appeared in 1495, being representative. Another form of the dance of death was the "three living and the three dead." Frequently, dead figures were carved on tombstones. Such decaying bodies were called macabres, and this sort of art is consequently referred to as "macabre." Closely associated

with the theme of the macabre was the tearful note in art. Rogier van der Weyden (*d.* 1464), a Flemish painter particularly emphasized this. His swooning Virgin beside the Cross, the penitent Mary Magdalene, and sorrowing St. John became characteristic artistic types copied in many lands. Van der Weyden's "Descent from the Cross" in the Escorial near Madrid is a typical example of this kind of art.

Books popular during the closing Middle Ages gave expression to this spirit, as well as instruction. The *Mirror of Human Salvation*, written before 1300, is a noteworthy example that enjoyed a great vogue. It contained an illustrated account of the lives of Jesus and the Virgin. Each episode prefigured the mission of Christ, and an appropriate commentary accompanied each scene. Its purpose was to instruct in the Christian faith the people of little education, for its pictures spoke clearly to those who could not read. Many an apprentice must have learned to read from the *Mirror of Human Salvation* and a similar work, the *Bible of the Poor*.

In the *Art of Dying*, composed during the fifteenth century, were written the hopes, fears, and terrors that oppressed the human heart. Life's somber drama was retold in realistic and pessimistic accounts. Numerous editions filled with woodcuts of the devil and his minions were extremely popular. One such picture shows a dying man surrounded by spirits of sinister aspect, who recall to him the sins that disfigure his past. One spirit tells him that he has lived in immorality, another that he has borne false testimony, another that he has killed a man, and a strange creature, half human and half ox, that he has lived a stingy life. Other pictures show the dying man being comforted by the church or oppressed by the thought of his house and treasure he is about to leave, the last determined onslaught of the devil and his evil company, and, finally, the departure of the soul, which is received by the angels in heaven while the demons, enraged and in confusion, stand helplessly by the bedside crying, "Our hope is gone," "We have lost a soul," "I am consumed with wrath," and "Oh, the shame of it!"

The tearful note was popular also in sermons and other literary forms but nowhere was more effective than in *The Pearl*, an allegorical fourteenth-century poem of unknown authorship. Marguerite (from the Latin *margarita*, pearl) has died, and her father grieves for her. He has visions of a radiant landscape.

> Wondrously the hill-sides shone
> with crystal cliffs that were so clear;
> and all about were holt-blue woods bright,
> and trunks as blue as hue of Inde;
> and close-set leaves on every branch
> as burnish'd silver sway'd and swung;

when glided 'gainst them glinting gleams,
splendent they shone with shimmering sheen;
and the gravel I ground upon that strand
were precious pearls of Orient;
if set beside that wondrous glow!

He spies the pearl, his daughter.

More marvels then did daunt my soul;
I saw beyond that merry mere
a crystal cliff that shone full bright,
many a noble ray stood forth;
and at the foot thereof there sat a child. . . .

I knew her well, I had seen her ere.
As gleaming gold, refin'd and pure,
so shone that glory 'neath the cliff;
long toward her there I look'd,—
the longer. I knew her more and more. . . .
"O Pearl!" quoth I, "Bedight in pearls,
art thou my Pearl, that I have plain'd,
bewept by me, so lone, a-night?
Much longing have I borne for thee. . . .
pensive, broken, forpined am I;
but thou hast reach'd a life of joy,
in the strifeless home of Paradise.
What fate hath hither brought my jewel,
and me in dolorous plight hath cast?
Since we were sunder'd and set apart,
A joyless jeweler I have been.

Two hymns that have won an enduring place in literature date from this time. The first, the *Dies Irae* by Thomas of Celano (*d.* 1255), describes in sonorous verse the dramatic day of the Last Judgment.

Day of wrath! O day of mourning!
See fulfilled the prophet's warning,
Heaven and earth in ashes burning!

O what fear man's bosom rendeth,
When from heaven the Judge descendeth,
On whose sentence all dependeth!

Wondrous sound the trumpet flingeth;
Through earth's sepulchers it ringeth;
All before the throne it bringeth.

Death is struck, and nature quaking,
All creation is awaking,
To its Judge an answer making. . . .

What shall I, frail man, be pleading?
Who for me be interceding,
When the just are mercy needing?

Ah! that day of tears and mourning!
From the dust of earth returning
Man for judgment must prepare him;

Spare, O God, in mercy spare him!
Lord all pitying, Jesus blest,
Grant them thine eternal rest.

The *Stabat Mater Dolorosa*, a hymn of uncertain authorship, strikes the note of sorrow. The Blessed Virgin stands weeping by the Cross on which is hanging the lifeless form of her son.

At the cross her station keeping,
Stood the mournful mother weeping,
Where he hung, the dying Lord,
For her soul of joy bereavèd,
Bowed with anguish, deeply grievèd,
Felt the sharp and piercing sword.

O how sad and sore distressèd
Was that mother highly blessèd
Of the sole-begotten One.
Deep the woe of her affliction,
When she saw the crucifixion
Of her ever-glorious Son.

Religious Drama. The religious drama of the time may be divided into two classes, miracle, or mystery, plays and morality plays. The former were dramatized versions of biblical stories presented by guildsmen. A group of such stories, called a "cycle," were played before large crowds on saint's days or on market days. A cycle of plays covered a vast field—the story of man from the Creation to the Last Judgment, with its scenes of hell and its vistas of heaven. Among other favorite subjects were the Creation, Noah and the ark, Abraham preparing to sacrifice Isaac, Gabriel saluting Mary, the Nativity, the Crucifixion, and the Last Judgment. Each of these scenes was presented in different parts of the town in the biblical sequence. The actors were craftsmen without special training in the actor's art, amateurs much like the burghers in Shake-

speare's *Midsummer Night's Dream*, who presented their play *Pyramus and Thisbe*.

The pathetic note as well as the crude humor of these plays met with the approval of the crowd. Many wept over the words of little Isaac to his father.

> Now I wold to God my moder were her on this hyll!
> She woold knele for me on both hyr kneys
> To save my lyffe.

The crowd laughed roundly when the devil, fuming and snorting, jumped off the platform and ran among them playing crude pranks. They were amused at Herod, who raged and stamped impatiently. Especially popular was the scene in which Noah could not manage his wife. When Noah and his family entered the ark, his wife rushed out, distaff in hand, and made the following speech.

> Sir, for Jak nor for Gill will I turne my face,
> Till I haue on this hill spon a space
> On my rock,
> Well were he, myght get me!
> Now will I downe set me.
> Yit reede I no man touch me,
> For drede of a knok.

Morality plays dealt with abstract themes: the characters accordingly had such names as Good Deeds, Faith, and Death. In *Everyman*, a popular English morality play of the fifteenth century, the chief character, for whom the play is named, is called by Death. Everyman realizes that Goods, Kindred, and Good Fellowship must leave him, but Good Deeds and Knowledge stand by him. Confession comes to his aid and tells him that God will grant his favor.

> Whan with the scourge of penaunce man doth hym bynde,
> The oyle of forgyuenes than shall he fynde.

Everyman is sorry for his sins and feels life's last forces ebbing.

> O, all thynge fayleth, saue God alone—
> Beaute, Strength; and Dyscrecyon;
> For whan Deth bloweth his blast
> They all renne fro me full blast.

The Angel then exhorts Everyman.

> Come, excellente electe spouse to Jesu!
> Here aboue thou shalte go,
> Bycause of thy synguler vertue.
> Now the soule is taken the body fro;

Thy rekenynge is crystall clere.
Now shalte thou in to the heuenly spere;
Vnto the whiche all ye shall come
That lyueth well before the daye of dome.

Devotio Moderna. Especially characteristic of the religious spirit of the closing Middle Ages is the literature of a type of piety known as the *Devotio Moderna*, or New Devotion. As in the case of sermons, illustrated books teaching religion, morality and mystery plays, and late medieval economic theories, the New Devotion sprang from the religious needs of the people, especially those living in the towns. Instead of straining after theological subtleties, the followers of the New Devotion emphasized such activities as prayer, partaking of the sacrament, helping the poor, teaching children, and writing pious treatises. The founder of the New Devotion was a Netherlander named Gerhard Groot (*d.* 1384), who spent many years in Deventer preaching, teaching, and helping the poor. He exerted a profound influence, and attracted followers who patterned their lives after him and after his death continued his teachings. Thus arose the Brothers of the Common Life, who became numerous during the fifteenth century and had houses in the Netherlands, France, and Germany. The brothers inculcated piety and moral seriousness, thus helping to form the temper of late medieval moral life.

Most typical of the New Devotion is *The Imitation of Christ*, a classic manual of devotion by Thomas à Kempis. Though he was not one of the Brothers of the Common Life, Thomas was brought up by them and well expressed their views. He spent most of his uneventful life in a monastery in Zwolle, where he died in 1471. *The Imitation of Christ* is one of the world's great works; no other work except the Bible has been so widely read. For generations, it has served as a practical manual to teach piety and encourage Christian reflection. The book contains admonitions on spiritual living and reflections providing consolation. The author states that the "doctrine of Christ exceedeth all the doctrines of holy men; and he that hath the spirit will find therein the hidden manna." Worldly wisdom is worth little in comparison; a true Christian life is more precious than theological subtlety.

What doth it avail thee to discourse profoundly of the Trinity, if thou be void of humility and art thereby displeasing to the Trinity? Surely profound words do not make a man holy and just; but a virtuous life maketh him dear to God. I had rather feel contrition than know the definition thereof. If thou didst know the whole Bible by heart and the sayings of all the philosophers, what would all that profit thee without the love of God and without His Grace?

François Villon. The poet François Villon was born in 1431 and died in obscurity after 1462. He came from poor but respected parents

of the lower bourgeois class and received an excellent education, finally in 1452 taking the master's degree at the University of Paris. Villon never received a post in church or government. Instead, he eked out a miserable subsistence, living with the poor and consorting with the outcast—loose women, robbers, and cutthroats. Falling afoul of the law, he was lodged in prison. But, harsh as was his portion in life, he possessed a saving sense of dignity.

Poor was I from my earliest youth,
  Born of a poor and humble race;
My sire was never rich, in sooth,
  Nor yet his grandfather Erace;
  Want follows hard upon our trace
Nor on my forbears' tombs, I ween,
  (Whose souls the love of God embrace!)
Are crowns or sceptres to be seen.

His *Lesser Testament*, written in 1456, relates his distress from unrequited love.

To 'scape the ills that hem me round,
  It were the wiser to depart.
Adieu! To Angers I am bound,
  Since she I love will nor impart
  Her grace nor any of her heart.
I die—with body whole enough—
  For her; a martyr to Love's smart,
Enrolled among the saints thereof.

Villon pretends that he is about to die and draws up his last will and testament. To one friend he bequeaths his hose "Which on the clothes-pegs hang" and continues.

Unto my barber I devise
  The ends and clippings of my hair;
Item, on charitable wise,
  I leave my old boots, every pair,
  Unto the cobbler and declare
My clothes the broker's, so these two
  May when I'm dead my leavings share,
For less than what they cost when new.

More tender is his remembrance for poor and defenseless children.

Item, this trust I do declare
  For three poor children named below:
Three little orphans lone and bare,
  That hungry and unshodden go
  And naked to all winds that blow;

That they may be provided for
And sheltered from the rain and snow,
At least until this winter's o'er.

The *Greater Testament* made Villon immortal. In 1460 he was thrown into prison but was freed through the clemency of King Louis XI. Next year, Villon was back in Paris, visiting his old haunts, and wrote his great poem, which has many striking passages.

God grant great lords to do aright,
That live in luxury and ease!
We cannot aught to them requite,
So will do well to hold our peace.
But to the poor (like me), that cease
Never from want, God patience give!
For that they need it; and not these,
That have the wherewithal to live,— . . .[1]

The ballade written when with four others he was to be hanged no less deserves a place in our memory.

Men, brother men, that after us yet live,
Let not your hearts too hard against us be;
For if some pity of us poor men ye give,
The sooner God shall take of you pity.
Here are we five or six strung up, you see,
And here the flesh that all too well we fed
Bit by bit eaten and rotten, rent and shred,
And we the bones grow dust and ash withal;
Let no man laugh at us discomforted,
But pray to God that he forgive us all.

The rain has washed and laundered us all five,
And the sun dried and blackened; yea, per die,
Ravens and pies with beaks that rend and rive
Have dug our eyes out, and plucked off for fee
Our beards and eyebrows; never we are free,
Not once, to rest; but here and there still sped,
Drive at its wild will by the wind's change led,
More pecked of birds than fruits on garden-wall;
Men, for God's love, let no gibe here be said,
But pray to God that he forgive us all.[2]

[1] *Poems by Francois Villon*, tr. by John Payne, pp. 118, 93, 99, 117 (The Modern Library), Liveright Publishing Corporation, New York.

[2] Wyndham Lewis, D. B., *Francois Villon. A Documentary Survey*, pp. 353, 355. Garden City Publishing Company, Inc., New York.

EDUCATION. One feature peculiar to medieval culture was the excessive importance attributed to the study of logic. The gathering of facts was not sufficiently emphasized. For example, that one should study the structure of the human body in great detail in order to acquire a knowledge of anatomy was an unknown idea to students of medicine. Yet without such minute knowledge no basis for accurate medical diagnosis is possible. Similarly, students gave little attention to the data of geography, physics, chemistry, biology, and geology and so knew little about these subjects, which today hold a prominent place in the curriculums of our schools. But we should remember that our forefathers had few or no instruments with which to make investigations. The microscope and telescope had not been invented. Even so commonplace an instrument as the watch did not exist; until 1500, hence, no student could time any movement accurately. However, our forefathers fully acquired the learning of the Arabs; by the time of Thomas Aquinas (*d.* 1274), they had mastered the scholarship of the Greco-Roman world and also the contributions made thereto by Arab and Jewish scholars.

The use of logic was peculiarly barren. By itself, logic can accomplish little; only when a starting point in facts is supplied can one make progress. Logic failed to lead medieval students to a fuller knowledge of nature because they had not developed mathematical, chemical, biological, or historical study. Many modern scientific discoveries originally were brilliant guesses or hypotheses, as, for example, the discovery by Kepler (*d.* 1630) that the planets revolve around the sun, not in circular orbits as Copernicus (*d.* 1543) had taught, but in elliptical orbits. Such hypotheses are checked many times by observation or experiment until finally it becomes apparent that they are correct or nearly so. The making of hypotheses and checking them by observation and experiment are likely to be as important as the processes of induction and deduction. But it was almost impossible to employ this method effectively at a time when experimentation was in its infancy. Years had to elapse before students were to possess the instruments necessary in experimentation.

There were other defects in medieval education, caused by the perennial bread-and-butter question. Unfortunately, as the vocational ideal becomes prominent, the educational value of a study often declines. Thus, instead of studying law to become scholars, students merely desired to learn enough to win a post in the government or the church. People so trained became fair lawyers and even good administrators but in general were better as servants than as directors. The same vocationalism also obtained in medicine; students hastened to learn what was taught rather than to study a subject thoroughly, add to the knowledge concerning it, or deepen their understanding of it. Neither in law nor in medicine, therefore, were students in the habit of finding new facts or

forming new ideas. The vocational spirit led to traditionalism, which meant intellectual decline.

In theology, the study of the Christian religion, men reasoned acutely about theological problems and drew up long theological treatises. These remain to this day impressive monuments of learning in spite of the intellectual changes during the intervening centuries. Scholastic philosophy has continued to be vital and inspiring, and during the past two generations we have witnessed a noteworthy revival of interest in it. But traditionalism more and more controlled these studies during the closing centuries of the Middle Ages so that little new knowledge or deeper understanding developed. Further, few students, as compared with those who studied the liberal arts and law and medicine, took degrees in philosophy and theology.

Such were some of the limitations of the higher learning of the time. The state of popular education was even more open to criticism. Peasants were illiterate; living on manors in the country, they had little need to acquire even the simplest rudiments of education. They learned how to work their lands as their fathers had worked them and received some elementary instruction in religion. The majority of the lower class town dwellers had little occasion to read. They worked at their crafts from morning till night and, like the peasants of the countryside, received some instruction in religion.

The upper class of town dwellers were better educated. Dante is a striking instance of this, and we may assume that all Florentines of his rank and station could read and write. Often they were interested in literature, theology, and kindred matters. They frequently sent their sons to the universities to study Roman law because that was a practical study—like the business courses in our universities. The noblemen who lived on their manors in the country had little need to read and write, for they lived in the traditional way of their forefathers, supervising the activities on their property. At best, their reading was limited to the chivalric romances or perhaps the poems of troubadours. There were notable exceptions, however, as in the case of Pierre Abélard, Albertus Magnus, and Thomas Aquinas, all of whom belonged to the nobility.

Such were some of the major features of the thought, life, art, and ideas of our forefathers at the close of the Middle Ages. There was much that was noble and praiseworthy, particularly the spirituality with which they viewed life. On the other hand, much of this culture, although profound and intense, was too narrow for the needs of a rapidly growing society. There also were positive defects and moral blemishes. In fact, changes in education, science, art, and even in practical religion were overdue. When the moment to make these changes came, it was with a force that threatened to carry away the very foundations of what

made the Middle Ages truly great in the history of culture. To these impending changes we now turn our attention.

FOR FURTHER READING

CHEYNEY, E. P.: *The Dawn of a New Era*, 1250–1453
COULTON, G. G.: *Art and the Reformation*
———: *Chaucer and His England*
CREIGHTON, MANDELL: *History of the Papacy*
EHRENBERG, RICHARD: *Capital and Finance in the Age of the Renaissance*
HUIZINGA, JAN: *Waning of the Middle Ages*
HYMA, ALBERT: *The Christian Renaissance*
KERR, A. E.: *Jacques Coeur, Merchant Prince of the Middle Ages*
KRÜGER, GUSTAV: *The Papacy, The Idea and Its Exponents*
LUCAS, H. S.: *The Renaissance and the Reformation*, Chaps. IV–XIII
MILMAN, H. H.: *History of Latin Christianity*
SEIGNOBOS, CHARLES: *History of Medieval and Modern Civilization*
STUART, D. M.: *Men and Women of Plantagenet England*
TAWNEY, T. R.: *Religion and the Rise of Capitalism*

Chapter XXXII

AGE OF HUMANISM: THE RENAISSANCE

Type of the antique Rome! Rich reliquary
Of lofty contemplation left to Time
By buried centuries of pomp and power!
At length—at length—after so many days
Of weary pilgrimage and burning thirst,
(Thirst for the springs of lore that in thee lie,)
I kneel, an altered and an humble man,
Amid thy shadows, and so drink within
My very soul thy grandeur, gloom, and glory!

—Edgar Allan Poe

WITH this chapter we turn to the Renaissance—an age of profound change in medieval ways of thinking. Formerly, when scholars taught that the Middle Ages were a barren period, it was asserted that a rebirth, or renaissance, of civilization took place in Italy after 1300. It was thought that a new age dawned during which the good features of modern life came into existence. But this view is no longer accepted; the term Renaissance, instead of meaning a rebirth of civilization, merely stands for those significant cultural changes which developed in Italy after 1300 and spread to other parts of Europe before 1600.

Conditions Favoring Change. Social and economic conditions favored changes in thought and ways of living. Commerce and industry flourished increasingly and towns became prosperous after the year 1200, especially in northern Italy. Venice, at the head of the Adriatic, had long been the center through which spices and articles of luxury were imported from the East. Milan in the center of the fertile Lombard plain, also was a wealthy commercial center, manufacturing brocades and iron goods. Lucca enjoyed a monopoly of the silk trade. Florence on the river Arno became noted for banking, woolen cloths, and silks. These were the more prominent cities of Italy; many smaller communities also felt the stimulus of the busy coming and going of merchants and travelers and the changes brought about by industry. These little Italian states were vigorous and daring. They created a new economic and social world from 1300 to 1600, transforming European culture into something very different. People brought up in such an environment sooner or later voiced discontent with former ways of living.

Outside Italy, conditions likewise favored changes in thought and action. Great wealth was accumulating, and the town class was becoming influential. But the regions north of the Alps and those of the Spanish peninsula lagged behind northern Italy. Not until the beginning of the sixteenth century did rapid change set in. This was partly due to the epochal voyage of Vasco da Gama from Lisbon around the Cape of Good Hope to Calicut in India, to be described in the next chapter. Thenceforth, the western market of oriental goods shifted from Venice to Lisbon, from the Mediterranean to the Atlantic seaboard. This was a revolution of the highest importance; but it was matched by another equally significant—the opening of the hoards of silver and gold in Mexico, Peru, and Bolivia after the conquest of Mexico by Cortes in 1521 and of Peru by Pizarro in 1532 and 1533. The flow of precious metal into western Europe through Spain proved a powerful stimulus to the economic and social life of Europe.

The king of Spain, who also ruled over the Netherlands, became the mightiest prince in Christendom. The kings of France and England commanded the respect of many because of their military resources and ability. Even Gustavus Vasa, the new ruler of Sweden, was a strong monarch. Like the wealthy rulers and merchants of the city-states of northern Italy, these princes were able to assume leadership in respect to new ideas and methods. In Germany, however, the emperor remained poor although German towns like Nuremberg and Cologne shared significantly in the new movement. The towns of the Netherlands, which included those of Flanders, Brabant, Holland, and a number of adjoining states, were especially important centers of new ideas.

HUMANISM. The chief of the new conceptions was Humanism, a word often used and frequently misunderstood because it is associated with the culture of many ages. Cicero discussed it in his *On the Orator*, stating that boys who some day would assume leadership in state and society should prepare themselves by studying literature, philosophy, rhetoric, history, and law. A man so trained was said to be *humanus*, or human. "We are all called men," said Cicero, "but only those of us are human (*humani*) who have been civilized by the studies proper to culture." This kind of culture was called *humanitas*, a Latin word equivalent to our "Humanism." But the Humanism of the Renaissance has a special connotation. It implies a decline in the binding power of religion in thought and action and hence opposition to medieval theology, philosophy, art, and letters, aided by the cultivation of the pagan aspects of Greek and Roman life that had been ignored in the Middle Ages.

PETRARCH. The person who initiated the humanist revolt was Francesco Petrarch; the community that brought him forth was Florence. Petrarch's father was a friend of Dante and like him was exiled from

Florence. Petrarch accordingly was brought up near Avignon, at that moment the residence of the popes. He studied law first at the university in Montpellier and next in Bologna to prepare himself for a practical career, as so many youths of the town-dwelling class were doing. But Petrarch hated law and on the death of his father in 1326 took holy orders, hoping in this way to find leisure for study. Thereafter he lived a roving life, seeking the friendship of high-placed persons in church and government, doing what pleased him most. He finally retired to Arquà Petrarca in the Euganean Hills near Padua, where he died in 1374.

What strikes us about Petrarch is his emotionalism. Hence, Petrarch the poet illustrates some of the vulnerable aspects of the culture of the time. Deeply emotional, he acted almost wholly in the light of his intuitions. He did not reason clearly about the things that troubled him but none the less felt wrongs keenly. This is why his poetry is so important in revealing the change of opinion that was to become a major feature of the thought of the later Middle Ages. Petrarch well exemplifies the fact that an artist may herald changes which a scholar or student often cannot predict.

Petrarch perfected a remarkable verse form, the sonnet. This lyric form consists of fourteen rhymed lines divided into two parts, the octave and the sestet. A profoundly moving thought stated in the first four lines of the octave is repeated with some slight variation or elaboration in the second four lines. The thought turns in the first half of the sestet; in the second half, it ends in hope, despair, resolution, consolation, or some such emotion. Various kinds of sonnet have been produced in English literature, introduced by the poets Surrey and Wyatt. Shakespear, Milton, Wordsworth, and Elizabeth Barrett Browning also wrote beautiful sonnets.

Petrarch's Laura, who played a great part in his life, is somewhat like Dante's Beatrice, but more human and less mystical. Petrarch saw her in church one day in Holy Week in 1327. She never knew that Petrarch had been attracted to her and died without becoming acquainted with him. He had entered the priesthood in 1326 and of course realized that his sentiment was hopeless. But he never forgot her as a priest faithful to his vows should do and long afterward described the occasion when he first saw her.

'Twas on the blessed morning when the sun
  In pity to our Maker hid his light,
That, unawares, the captive I was won,
  Lady, of your bright eyes which chained me quite;
That seem'd to me no time against the blows
  Of love to make defence, to frame relief:

Secure and unsuspecting, thus my woes
Date their commencement from the common grief.
Love found me feeble then and defenceless all,
Open the way and easy to my heart
Through eyes, where since my sorrows ebb and flow:
But therein was, methinks his triumph small,
On me, in that weak state, to strike his dart,
Yet hide from you so strong his very bow.

That he had occasional twinges of conscience—because he was a priest, vowed to celibacy and dedicated to the service of the church—is shown by the following sonnet:

Love held me one and twenty years enchain'd,
His flame was joy—for hope was in my grief!
For ten more years I wept without relief,
When Laura with my heart, to heaven attain'd.
Now weary grown, my life I had arraign'd
That in its error, check'd (to my relief)
Blest virtue's seeds—now, in my yellow leaf,
I grieve the misspent years, existence stain'd.
Alas! it might have sought a brighter goal,
In flying troublous thoughts, and winning peace;
O Father! I repentant seek thy throne:
Thou, in this temple hast enshrined my soul,
Oh, bless me yet, and grant its safe release!
Unjustified—my sin I humbly own.

Petrarch's life was a tissue of contradictions. Although a priest, to the end of his days he cherished the memory of a forbidden love and at heart adopted an unchristian and even pagan attitude toward it. This constitutes more than a personal problem of Petrarch's, for it was an experience confronting many others as well. The question was: "To what extent are one's moral actions to be governed by an eternally valid system of morals? Is one to orientate his life to the eternal, or should be simply yield to the practical demands of this life?" During the Middle Ages, this had always been answered in no uncertain way; moralists held that one should esteem eternal values that reach beyond the limits of life more highly than the concerns of this life. In other words, the medieval ideal was ascetic, or otherworldly. Petrarch's view, against which he struggled so faintly, was just the opposite; it exalted the temporal interests of life. That is, his view was "secular," worldly. This also was the tendency of the age in which he lived, its answer to the problem of changing values that all men had to face. Secularism became the chief feature of the new humanist culture, and

Petrarch's poetry takes on added significance because it clearly heralded this new attitude.

Another aspect of Petrarch's life was his intense, lyrical love for the vanished glories of ancient Rome. The root of this affection was partly the common medieval habit of looking upon Rome as a lost utopia and partly Petrarch's own paganism. He loved ancient Rome as intensely as St. Bernard or St. Francis loved the Christian ideals of poverty, celibacy, and obedience. He loved pagan Roman culture for its artistic beauties; poet that he was, he felt in them some of the worldly aspects of his own soul. Imitating Vergil, he wrote a long epic, the *Africa*, celebrating the greatness of Scipio Africanus. Petrarch imagined himself writing to the authors of antiquity from Homer to Seneca, the result being the *Familiar Letters*. He likewise wrote the *Lives of Illustrious Men*, a collection of thirty-one biographical sketches of notable characters in Roman history. These writings and Petrarch's zeal awakened fervent admiration for the pagan culture of the Greco-Roman world. Thus Petrarch set the fashion of reading the non-Christian literature of the ancients, soon to become an obsession among the better educated classes in Florence and other Italian cities.

A mighty passion possessed Petrarch's soul to collect the works of ancient authors, which were scattered in many places and small collections, hard to find and little studied. Wounded by this lack of appreciation, he wandered far and wide, feverishly hunting out ancient writings and copying them in beautiful handwriting. As Cicero was Petrarch's favorite author, he sought Cicero's works wherever he went. This passion was to prove contagious, for others began to imitate him. Many manuscripts were discovered when the libraries of monasteries and cathedrals were searched. In this way, great collections of classical Greek and Latin authors came into existence.

Petrarch was intensely patriotic. He identified Italy with ancient Rome. But how had Italy fallen from her one-time greatness as mistress of culture and queen of the earth! On every hand the poet saw dissension and intrigue. He himself had suffered from them, for his father was the victim of a feud that had driven him from Florence in 1302. He lamented that adventurers played with the peace of Italy, that the country had become the sport of the emperors of the Holy Roman Empire.

> O my own Italy! though words are vain
> The mortal wounds to close,
> Unnumber'd, that thy beauteous bosom stain,
> Yet may it soothe my pain
> To sigh forth Tiber's woes,
> And Arno's wrongs, as on Po's saddened shore
> Sorrowing I wander and my numbers pour.

Ruler of heaven! By the all-pitying love
That could thy Godhead move
To dwell a lowly sojourner on earth,
Turn, Lord! on this thy chosen land thine eye:
See, God of charity!
From what light cause this cruel war has birth;
And the hard hearts by savage discord steel'd,
Thou, Father! from on high,
Touch by my humble voice, that stubborn wrath may yield!
Ye, to whose sovereign hand the fates confide
Of this fair land the reins,—
(This land for which no pity wrings your breast)—
Why does the stranger's sword her plains invest?
That her green fields be dyed,
Hope ye, with blood from the Barbarian's veins? . . .
Ah, is not this the soil my foot first pressed?
And here, in cradled rest,
Was I not softly hushed?—here fondly reared?
Ah! is not this my country?—so endeared
By every filial tie!
In whose lap shrouded both my parents lie!
Oh! by this tender thought
Your torpid bosoms to compassion wrought,
Look on the peoples' grief!
Who, after God, of you expect relief;
And if ye but relent,
Virtue shall rouse her in embattled might,
Against blind fury bent,
Nor long shall doubtful hang the unequal fight;
For no,—the ancient flame
Is not extinguished yet, that raised the Italian name!

A person so sensitive to external influences could not resist the alluring beauties of nature. Petrarch traveled far and wide, climbed mountains, practiced gardening, and retired to a rustic dell at Vauclause on the banks of the river Sorgues, not far from Avignon in southern France. He addressed a poem to its haunting beauties, which served to recall Laura to his mind.

Ye limpid brooks, by whose clear streams
My goddess laid her tender limbs!
Ye gentle boughs, whose friendly shade
Gave shelter to the lovely maid!
Ye herbs and flowers, so sweetly press'd
By her soft-rising snowy breast!
Ye Zephyrs mild, that breathed around
The place where Love my heart did wound!

Now at my summons all appear,
And to my dying words give ear.

Although he knew no Greek, Petrarch realized that Greek culture was the parent of the Roman. He wanted passionately to read Homer's *Iliad* and *Odyssey* in the original. Knowledge of the Greek language was rare in western Europe during the Middle Ages. After the decline of the Roman Empire, few people read Greek, and as time wore on Greek books totally disappeared. There were a few scholars like Erigena in the Celtic monasteries who read Greek. But, in the fourteenth century, scholars who read Greek were so few that, when Petrarch wanted someone to teach him, he could find no one save a southern Italian with an imperfect knowledge of the language. This ignorance in western Europe is remarkable when we bear in mind that a Greek little different from the ancient classical Greek of Plato and Xenophon was still spoken in Constantinople and other parts of the Byzantine Empire with which western Europe had commercial intercourse.

Boccaccio. Giovanni Boccaccio (*d.* 1375) was deeply influenced by Petrarch, followed his example, and eagerly studied the lore of the ancient Greeks and Romans. He, too, tried to learn Greek; but although he made greater progress than Petrarch, he never mastered the tongue. He wrote short manuals on classical geography, mythology, and biography, collected manuscripts, and studied Livy and Tacitus.

But important as all these efforts were, the world remembers Boccaccio for his stories in the *Decameron*, a series of 100 short tales arranged in groups of 10. The setting is the time of the Black Death, which ravaged Florence in 1348. Three young men and seven young women fled the contagion and retired to a neighboring villa. There they entertained themselves by telling 10 tales each day for 10 consecutive days. The subject matter of these stories was drawn from familiar feudal romances and popular tales. But there was a new spirit in them, banter and biting sarcasm often being the chief note. None of the old ideals—chivalric, monastic, or priestly—was spared. Boccaccio was a member of the easygoing and not very moral upper class typical of the larger towns of Italy—people who would listen to questionable stories about priests, nuns, or monks. Although holy things are treated with irreverence and the sexual note often provides the turning point, the *Decameron* has won a secure place among the great books of the world. This is not only because it expresses the morals of Boccaccio's society but because of its prose. So matchless is his style in its simplicity and lucidity that he is regarded as one of the masters of Italian prose writing.

The Classical Revival. A veritable craze to study the ancient classics now developed. Petrarch's insatiable love for them had stirred

Boccaccio and others, who in turn inspired their pupils, friends, and admirers. A fortunate accident, the chance appearance of a learned Greek from Constantinople named Manual Chrysoloras (*d.* 1415), further encouraged them. He had come as a diplomatic agent from the emperor of the Byzantine Empire and at once attracted the attention of Petrarch's disciples. Here was a man who spoke Greek and read Greek masterpieces and whose mind was stored with knowledge of ancient Greek civilization. He spoke of that glorious Greek world which through the Middle Ages had never ceased to shine with romantic splendor. No one in all the West could match his knowledge. His hearers were fired with zeal to master the Greek language and Greek masterpieces. Finally, in 1393, he was invited to Florence, where he taught Greek at the university. The Humanists there made good use of their opportunity, and so it was from Florence that the new Greek studies spread widely.

People who showed such eagerness to read the ancient classics eagerly collected libraries. There had indeed been libraries in earlier days in monasteries and cathedrals, but students had been interested chiefly in theology, Roman law, Galen, and Aristotle. Such works as Tacitus's *Histories* and *Annals* or Quintilian's *Institutes of Oratory* did not, as a rule, interest scholars. Nevertheless, these works, copied repeatedly since the disappearance of Roman civilization, had been preserved in monastic and cathedral libraries. Niccolò de Niccoli (*d.* 1437), one of the most successful collectors, was a wealthy Florentine merchant who spent vast sums to make a complete collection. Upon his death, he had amassed 800 volumes of Greek and Latin classics, a collection that still exists as part of the Laurentian Library in Florence.

Poggio Bracciolini (*d.* 1459), a pupil of Chrysoloras and a friend of Niccolò de Niccoli who obtained many a precious manuscript from him, was more successful than all his contemporaries in unearthing manuscripts. As papal secretary at the Council of Constance (1414–1418), he visited monasteries in Switzerland, France, and Germany. His most important discovery was Quintilian's *Institutes of Oratory*, a work that was to exercise much influence on Renaissance education. The significance of Poggio's discovery is made clear when we reflect that this is the only extant manuscript copy of Quintilian's work.

Education. One of the striking contributions of Humanism and the classical revival was a new conception of education. The idea of Cicero that a boy should be trained as an intelligent human being so that he might play a useful part in society once more became popular. The trouble with the old education was that it was too vocational to be useful in the highest sense.

Vittorino da Feltre (*d.* 1446), the most influential of Renaissance educators, was invited by the duke of Mantua—a petty state in the Po

Valley—to open a humanist school at his court. So successful was this school that Vittorino da Feltre became universally renowned. The school was situated amid attractive surroundings, as this was deemed necessary for the aesthetic growth of the pupils. Furthermore, Vittorino's idea was that education should not be limited to the children of any one class. His pupils were drawn from the ducal family, the noble families, and even the middle classes of Mantua, and he demanded the same mental effort from all. Education, as broad as humanity itself, was necessary for girls as well as boys. Vittorino believed that Greek, Latin, and Italian literature, together with mathematics, drawing, and music, should receive the major attention. To ensure thorough knowledge, there was much drill and repetition; memory work was stressed. Physical education in the form of horseback riding, swimming, fencing, and marching was made obligatory. Vittorino also insisted on good manners, emphasized character training, and insisted on religious instruction. His pupils were required to study the Bible and the Church Fathers, particularly the works of St. Augustine of Hippo. Vittorino's engaging personality further helped to influence his students and profoundly shape their moral and intellectual life. Such in brief was this experiment in putting the humanist conception of education into practice; that it was successful is apparent from the fact that many of the noblest men and women of the age were trained under Vittorino or his pupils.

Patrons. Without patrons, humanist culture would hardly have been possible. Patrons were men of wealth who supported and encouraged able and industrious students and artists. Some of these patrons had amassed great fortunes, as in the case of the House of Medici, which ruled Florence. Cosmo de' Medici was one of the most remarkable men of history: a clever ruler, a capable financier, an expert manager of business, a successful moneylender, a discerning supporter of talented artists and scholars, and, finally, a subtle diplomat. He built the monastery of San Marco for the Dominican friars in Florence, constructed the handsome palace in which he lived, and supported other building projects, all decorated by the best painters and sculptors. It is remarkable that one man combined successfully so many practical, literary, and artistic activities. His grandson Lorenzo the Magnificent, who ruled Florence from 1469 to 1492, was even more renowned. He showered favors upon writers and artists; their names amount to a roll call of the great figures of the Renaissance. The example set by such illustrious patrons proved contagious. Rulers and wealthy men imitated them, such as the kings of Naples, various popes, the dukes of Milan, Mantua, Urbino, and Ferrara, and other persons of humanist leanings.

THE COURTIER. Baldassare Castiglione's *Courtier* was one of the significant literary productions of the Italian Renaissance. Castiglione (1478–1529) was educated in the school of Vittorino da Feltre in Mantua and spent his happiest days in the service of the duke of Urbino. This afforded the opportunity to travel widely, even to visit England, and to become acquainted with famous men and women. Possessing an excellent humanist education and an observant mind, Castiglione became an influential figure at court. Being a courtier and diplomat in the highly refined courts of Italian princes of the Renaissance demanded intellectual ability and training. Castiglione held that a courtier should be educated like a Humanist: he should be able to take part in refined conversation, be possessed of tact and consideration, and have a ready wit, a comely figure, and a pleasing personality that would make him acceptable to all. Most of these advantages might be cultivated by anyone possessing a humanist education, but, Castiglione believed, more easily by one born of a noble family with good traditions to guide him. Though aristocratic in tone, Castiglione's *Courtier* expresses an ideal of what constitutes a gentleman. The gentleman of the Italian Renaissance was no fighting nobleman who could show himself to advantage only in the tournament. He was well educated, courteous, refined, interested in art and literature, a man of polite bearing, and possessed of infinite tact. Small wonder that Italian diplomats of the sixteenth century were noted for their subtlety and charm.

MACHIAVELLI. Another significant writer of the Renaissance was Niccolò Machiavelli (1469–1527). Born in Florence, he profited from the local humanist type of education and spent many years as secretary to the government of the city and also served as a diplomat. He had ample opportunity to observe politics and politicians. He was particularly oppressed by the misfortunes that afflicted Italy. How could this be remedied? Machiavelli answered this question in *The Prince*, a practical guide intended for Duke Lorenzo de' Medici (*d.* 1519), who Machiavelli hoped would expel the foreigners and unite Italy.

According to Machiavelli a prince should employ the methods that Italian politics had shown to be successful. He should not be restrained by moral considerations, for the end justifies the means. "He who has known how to employ the fox has succeeded best." He must be ready to do any wicked thing to gain what he wants. But he should dissemble and do everything in his power to appear just and clement. Machiavelli had a low moral estimate of men; he believed that a prince could maintain himself only by craft and subtle management. In other words, political action was to be decided by expediency and not by ethical considerations, as medieval moralists had taught. This indeed was the

common practice of the time, but Machiavelli was the first writer baldly to state it as a general principle. His *Prince* is a sad commentary on the nature of international relations and the ideal of international conduct during the Renaissance. Long after his time, politics and morality remained divorced; even today, this is the case, to the great detriment of human happiness.

Machiavelli is notable also as a literary stylist, ranking with Dante, Petrarch, and Boccaccio as a master of literary Italian. *The Prince* and the *History of Florence* possess a distinguished style and, in addition, are excellent examples of the new type of history writing produced by Humanists. Formerly, writers had composed chronicles in which events were grouped according to the year in which they happened, even though no logical relationship existed among them, whereas the new kind of historical writing was inspired by the histories of Livy and Thucydides. The newer histories, therefore, were genuine artistic compositions, clear, orderly, and logical.

Another significant aspect of Machiavelli's genius is his patriotism. Modern Italians regard him as a patriot and a founder of Italian national unity. He concluded *The Prince* with Petrarch's fervent verses.

> Virtue shall rouse her [that is, Italy] in embattled might,
> Against blind fury bent,
> Nor long shall doubtful hang the unequal fight;
> For no,—the ancient flame
> Is not extinguished yet, that raised the Italian name!

The Art of War, a discussion of wars as waged in Machiavelli's time, contains criticisms of the military methods of princes. Machiavelli especially lamented the absence of a native Italian soldiery, because, in his estimation, the employment of foreign mercenaries was the root of Italy's misfortunes. The *Discourses on Livy* contain Machiavelli's philosophy of history and government. These books have exerted vast influence on political thinking even to the present day.

Changes Accelerated by Humanism: Position of Women. From the foregoing description of humanist thought, it is clear that Humanism is to be regarded as a criticism of the life, thought, art, and manners of the day. Petrarch revolted against most features of the conventional thought of his time, Vittorino da Feltre developed a new type of education, Castiglione described the conceptions of gentlemanly conduct that the new age was producing, and Machiavelli broke with medieval ideas of government. Revolutionary as humanist thought might be, it did not become violent but did accelerate the changes observable in European society toward the close of the Middle Ages. One of the most interesting of these changes was in the position of women, for they as well as men

shared in the intellectual development of the Renaissance. In the school of Vittorino da Feltre, girls received the same education as boys. In the courts of Milan, Ferrara, Mantua, and Florence, women helped to direct diplomacy, government, and patronage of the arts. A good example is provided by the women in the court of Urbino as described by Castiglione in his *Courtier*. In humanist circles, women as a rule were considered the equals of men. Portia, the heroine in Shakespeare's *Merchant of Venice*, may be regarded as typical of the free woman of the Renaissance.

HUMANISM AND RELIGION. Humanists also criticized religion—an inevitable result of the church's position as the most potent agent of culture. When laymen were educated in the humanist learning, priests seemed more ignorant than ever before. Political influences were rampant in church life; and some priests, like Petrarch, for example, fell short of the priestly ideal in thought and conduct. At first, Humanists were not hostile to the church; some of them eagerly read the Church Fathers like St. Jerome and St. Augustine of Hippo. Many, in fact, were devout and led exemplary lives. The Florentine Ambrogio Traversari (1386–1439), for example, was so sensitive about pagan ideals that he avoided quoting ancient authors although he wrote almost like Cicero. Giannozzo Manetti (1396–1458), also a Florentine, was even more remarkable in this respect, as he committed to memory St. Paul's Epistles and zealously studied St. Augustine's *City of God* and Aristotle's *Ethics*. Most Humanists learned Greek in order merely to enjoy the beauties of Homer and other Greek writers, but Manetti even studied Hebrew in order to read the Scriptures in the original, believing that this would make possible a deeper understanding of the Christian faith and result in a more devout life.

The ideas of Traversari and Manetti bore ample fruit. The new age developed a more thorough knowledge of Christian literature than had ever been possible before. Scholars began to make careful philological studies of the Hebrew and Greek texts of the Bible. They also took pains to study the Church Fathers, Greek as well as Latin. Some writers have referred to this phenomenon as "Christian Humanism"—a not inapt phrase. Although humanist and critical, it was devout and loyal to the traditional faith. The new humanist learning, thus placed at the service of religion, proved an immense force toward reforming evil conditions, stimulating piety, and promoting a better type of education.

Not all Humanists remained loyal to the faith, however. Most typical of such as rebelled was Laurentius Valla (1405–1457), a Florentine educated by Humanists of the group that associated with men like Manetti. He abandoned the Christian faith, became an avowed pagan, and was a bitter and unjust critic of monks, priests, religion, and the church. He even went so far as to hold that one should gratify his

natural impulses without restraint. He believed that the conventions of morality were invalid and argued that marriage should be abolished. When we bear in mind that marriage was one of the seven sacraments, this audacious view was blasphemous as well as revolutionary. Valla's greatest work was *On the Donation of Constantine*, written in 1440. He disproved the common opinion that the political rights of the papacy had been conferred by the Emperor Constantine. His method was to compare the language of the *Donation* with the writings of the days of Constantine and thus reveal the unauthentic character of the document. Other scholars who were not Humanists had already cast doubts upon the genuineness of the *Donation*, but Valla won all the credit. Humanists became famous for this sort of critical ability, and made many contributions to the scholarship of the Renaissance.

Erasmus. North of the Alps a different type of Humanism developed. Men were less interested in the classical dilettantism of the Italians than in the moral aspects of Humanism. Therefore, they devoted their attention to religion and education and not to artistic expression. Chief among the Humanists of northern Europe was Desiderius Erasmus (1466–1536), a Netherlander born in Rotterdam. Frail in body and delicate in health—he apparently suffered from allergic difficulties—he found life hard. Educated by the Brothers of the Common Life, from whom he received his first lessons in piety, he acquired an excellent knowledge of the Latin and Greek classics and became the most famous Humanist of his day. His moral earnestness appealed to his contemporaries far more than the religious philistinism of Lorenzo Valla and the aesthetic interests of Italian Humanists.

Erasmus's conception of religion was destined to have significant consequences. Although he remained a Catholic to the end of his days, his piety was very different from that taught by the traditional church, which held that a person won salvation by carrying out in his daily life the precepts of the Gospels. Following the example of Christ, being sorry for one's sins, seeking forgiveness, resolving never again to lapse into sin, confessing, doing penance, and securing absolution would earn salvation. It was characteristic of Erasmus as a Humanist to stress the moral element of this religious practice but to neglect the practical and disciplinary activity of the church. Emphasizing the idea that Jesus was a great moral teacher, he minimized the efficacy of the sacraments.

Stressing the moral side of religion, Erasmus urged the need of education, for he believed that men could be made better and the problems of humanity solved by proper education. Medieval thinkers had always shown profound respect for education, but few, if any, had been so optimistic. Erasmus believed that true piety and moral excellence could be inculcated only if people read the Bible and the Church Fathers.

As many people as possible should be taught Greek and Latin that they might read the original words of the prophets, Jesus, and the apostles. Further, they should read the Church Fathers like St. Jerome to learn what the pure and uncorrupted church of the early centuries was like. But Erasmus was not a revolutionary. He believed that the church in spite of all shortcomings was a good institution and should not be destroyed. It is obvious that Erasmus's theology was somewhat like the theology of so-called "advanced" religious thinkers of the present day.

After making due allowance for his severity, it must be conceded that Erasmus was right in some of his strictures. He condemned the morals of soldiers, ill treatment of wives by husbands, mismanagement of states by princes and their readiness to precipitate wars, abuse of children, misplaced emphasis on religious vows, pilgrimages, penances, all formal observances without corresponding moral edification, and ignorance and moral incompetence among the clergy. But in these criticisms, it must ever be borne in mind, Erasmus rarely turns the coin and describes good priests and good conditions.

Though born in Rotterdam, Erasmus spent most of his days outside the Low Countries. He studied in Paris, visited England twice, traveled to Italy, repeatedly visited Germany, and spent his declining years in Basel. Like other enthusiasts, he carried on a voluminous correspondence with Humanists in all parts of Europe. Admirers exchanged letters with him, and these letters, which extended his influence to all parts of Europe and of which many hundreds have been preserved, give an excellent picture of the moral and intellectual state of Europe during Erasmus's manhood.

Erasmus was the first Humanist to make successful use of the printing press. His books, frequently reprinted and issued in pirated editions, were read everywhere. They had one great and constant purpose—the criticism and reformation of morals and religion. His *Adages*, a collection of excerpts drawn from classical authors, was a great help to people who could not read all the Latin and Greek classics. Here in brief compass they were given a selection of useful and impressive quotations. His *Handbook of a Christian Soldier* was intended to serve as a guide to practical piety, setting forth his ideas and also his criticisms of the official faith of the day. This book became influential among the middle classes, to whom Erasmus made a most successful intellectual appeal. His Greek New Testament, in a cheap edition that people could afford to buy, filled a long-felt need. But the most famous of his books was *In Praise of Folly*, a satire on human foibles that presented his conceptions of human nature. Almost as popular was the *Familiar Colloquies*, a collection of topics discussed in the form of dialogues. Its unique value lay

in its criticism of society's ills and the emphasis upon the possibility of human improvement.

COLET AND MORE. There were other Humanists in northern Europe who, like Erasmus, were interested chiefly in morals and religion. One of the most notable was the Englishman John Colet (*d.* 1519). Under his influence the school of St. Paul's in London became an important example of the kind of humanist educational work developed by Vittorino da Feltre at Mantua. Sir Thomas More, also an Englishman, was a noble character who took a serious view of the faults of the times. Well acquainted with the writings of Italian Humanists, he combined the best of their thought with deep insight and moral seriousness. His fame has steadily risen so that today he is regarded as one of the greatest of the Humanists. Few were willing, like him, to prove the sincerity of their convictions by readiness to die for them. He was beheaded on the scaffold in the Tower of London in 1535 because he refused to recognize King Henry VIII as head of the church in England. More's greatest book is the *Utopia*—a description of an ideal state and criticism of the society of his day.

RABELAIS. Intellectual and moral movements like Humanism are likely to bring forth a variety of genuises, some conservative, others revolutionary. The Italian Renaissance produced conservative men like Traversari and radicals like Valla, and the same variation is to be noted north of the Alps. Besides moderates like Sir Thomas More, there appeared the faintly radical Erasmus and the violently critical François Rabelais (1490–1553), the most significant French writer of the Renaissance. He entered a monastic order at the age of seven—a preposterous practice common at the time and one that Erasmus sharply criticized. Finding monastic life distasteful, he ran off to study medicine at the University of Montpellier. To the learning acquired in the monastery, he added much scientific knowledge and a passionate love for Greek and Roman classics. But, more important, he acquired that bias characteristic of many Humanists, hatred of all medieval learning and especially religious discipline.

Rabelais' immortal work is his *Heroic Deeds of Gargantua and Pantagruel*, written in French, not in the elegant Latin of the Humanists. Its style is coarse and vigorous, all the more effective because couched in the language of the people. Gargantua is a creature of extraordinary size and physical power, somewhat like Paul Bunyan, the popular figure in the folklore of the Puget Sound country. He is also indelicate, a creature of gross appetites, and too coarse for the sensitive minds of the present age. Book I describes the youth and education of Gargantua, satirizing the pedagogical practices of the day. Books II and III deal with Gargantua's son Pantagruel, who also is remarkable for his physical prowess.

The next two books describe Pantagruel's fanciful voyage to the recently discovered lands in the West. There he finds strange peoples whose ideas and habits gave Rabelais further opportunity to satirize moral, religious, and other conditions of his day.

RENAISSANCE ART IN ITALY. As in thought and letters, the Renaissance produced great changes in painting, sculpture, and architecture. Art too tended to become humanist, thus reflecting the conceptions of writers from Petrarch to Erasmus. To grasp this is to understand an important phenomenon of civilization—that art inevitably illustrates man's cultural activity.

Renaissance art consists in a long series of artistic productions that in Italy extended from Masaccio (*d.* 1429) to Michelangelo (*d.* 1564). So significant are these artists in the history of civilization that the changes they wrought in taste and skill of the Renaissance mark the highest level of painting in the Western world. Such was the influence of Renaissance art that succeeding generations have not been able to escape its magic. Even today the way we picture to ourselves the Last Supper is dictated by the artists of the Renaissance, particularly by the masterpiece of Leonardo da Vinci.

Masaccio, the first Florentine artist after Giotto able to make original contributions to the painter's art, alone grasped the inner meaning of that master's work. When we contemplate the character of Masaccio's painting and bear in mind that he died before thirty, we conclude that he must have been one of the most original geniuses in the history of Italian painting. His frescoes are preserved on the walls of the Carmine Church in Florence. The picture known as "Caesar's Tribute" shows Christ with a group of men disposed realistically about him. Masaccio had learned something of the secret of chiaroscuro—light and shade—painted figures as if they possessed real weight, and gave to groups a psychological unity that no other painter had been able to impart. This remarkable success impressed Florentine artists, who repeatedly went to the Carmine Church to study the secret of Masaccio's technique.

The first sculptural work to be noticed is that by Lorenzo Ghiberti. Influenced by Giotto, he produced the double bronze doors at the north side of the baptistery in Florence. They are divided into twenty-eight panels, each of which shows a scene from the New Testament, except four which deal with the four doctors of the church. But Ghiberti's greatest triumph was the double bronze east doors of the baptistery, each of which contains five panels showing scenes from the Old Testament. They are marvelous examples of naturalism. The sculptor has succeeded in giving the effect of perspective in spite of the fact that the figures are for the most part in low relief. So effective were the doors

that Michelangelo declared that they were "fit to adorn the entrance to heaven."

By about 1450, artists began to show the influence of Greek and Roman works of art. For long they had felt the subtle charm of classical art and occasionally had copied some of its forms. The Gothic sculptor Niccola Pisano, for example, had carved a nude Hercules on the pulpit in the baptistery in Pisa. Ghiberti also was influenced by the idealism that he saw in some classical works, and the influence may be observed on the east doors of the baptistery in Florence. One of these panels, for example, shows an Apollo-like torso of the boy Isaac as he kneels ready to receive the death stroke from his father Abraham. Perhaps even more evident is the influence of classical conventional decorative design on the jambs and lintel of the doorway and on the frame of the doors themselves.

This tendency to borrow ideas from classical art soon became a ruling passion. Artists began to combine the stern simplicity of Giotto with the idealistic humanism of Roman art. They also liked to imitate the plants, animals, and geometrical forms employed by classical artists in their decorative designs. But it must not be assumed, as it often is, that this admiration for classical sculpture alone produced a renaissance in art. There had been much artistic activity in medieval times. Renaissance sculptors did not laboriously seek to reproduce classical ideas. Art is always greater than archaeology; it belongs to the culture of the age that produces it.

Donatello. To Donatello (*d.* 1466), the most significant sculptor of the fifteenth century in Italy, belongs the honor of bringing together the trends of artistic endeavor, combining them in new creations and marking out the lines of future development. One of his great works is the statue of St. George in a niche of the church of San Michele in Florence. The figure possesses something of the Gothic stiffness of the previous century, but its simplicity is remarkable; we recognize in it the conviction which grew up with Giotto that superfluous details should be eliminated.

In 1432, Donatello went to Rome to study the sculptural and architectural remains of the ancient past. He was particularly captivated by the use ancient artists made of figures of young boys. His bronze "David" was the first production showing the fullest appropriation of classical ideas. Gothic realism modified by the subtle idealization of Greco-Roman art is the keynote. Every part of the noble form vibrates with energy as the boyish face looks down upon the severed head of Goliath. Further, it is important to note that this statue stood in the open, to be regarded from all angles, whereas Gothic statues were made to stand in niches to be seen from the front or side only. It is obvious that

a new sculpture, freed from intimate association with architecture, was evolving.

Donatello's equestrian statue in Padua, representing the mercenary general Gattamelata, is practically the first equestrian statue to have been made since Roman antiquity. One ancient equestrian statue, representing the Emperor Marcus Aurelius, still stood in Rome, and there were four ancient bronze horses above the porch of the church of

FIG. 76.—"Gatamelatta," by Donatello. (*Courtesy of the Metropolitan Museum of Art.*)

San Marco in Venice. They, too, are of classical workmanship, having been brought to Venice from Constantinople after the sack in 1204. It is possible that Donatello studied the statue in Rome, perhaps also the horses in Venice. At any rate, the statue of Gattamelata indicates Donatello's serious attempt to revive classical motifs. The general is dressed like a Roman commander; the horse is a stately creature moving forward majestically, its spirited head and realistic nostrils indicating the excitement of a triumphal march.

The della Robbia Family. Significant also was the sculptural work of the members of the della Robbia family, the most significant of whom was Luca (*d.* 1482), its founder. Like Donatello, he expressed the classic ideal, especially in his carved decorations for a singing gallery for the cathedral of Florence. But he and his family also produced many artistic works in clay to which they applied a beautiful glaze. At first they applied white reliefs on a blue background but later used various colors. Such inexpensive objects sold readily and so spread the new taste in plastic art among the less well to do.

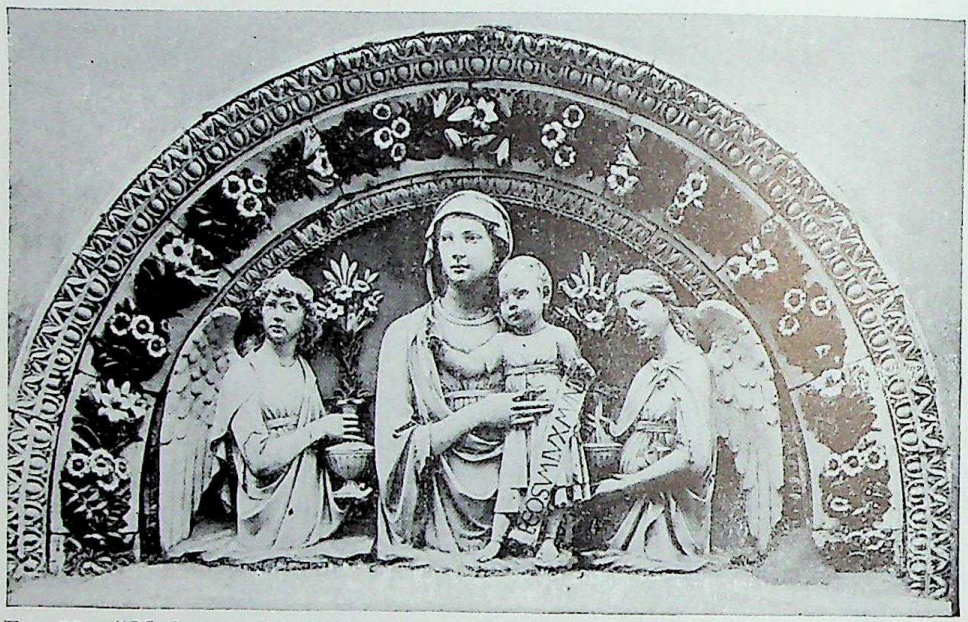


Fig. 77.—"Madonna, with Child and Angels," glazed terra cotta by Luca della Robbia. (*Courtesy of the Metropolitan Museum of Art.*)

School of Padua. The archaeological note became the specialty of a group of artists who belonged to the School of Padua. A mediocre painter named Francesco Squarcione (*d.* 1474) opened a museum of classical objects in Padua and insisted that pupils should duplicate these minutely. Even the veins in the marble and the hard outlines of statues were to be copied. He required his pupils to paint classical garlands of laurel leaves mingled with fruit and flowers as adornments for *Pietàs*, Madonnas, and other religious subjects. This archaeological zeal marked the beginning of the vogue of filling pictures with classical bric-a-brac such as broken arches and columns, which was perhaps the worst feature of the new tendency.

Another new custom was to give every picture the most perfect archaeological setting possible. Mantegna (*d.* 1506) was the first to

make a success of this idea. He completely mastered the problems of perspective, establishing a mathematically exact relationship of objects. He possessed an accurate knowledge of anatomy, thus carrying to perfection the tendency to reproduce the human form scientifically exact in all its poses. He also was an archaeologist; few of his rivals possessed such accurate knowledge of classical objects. His pictures therefore are a symposium of art concepts of the time, filled with Greco-

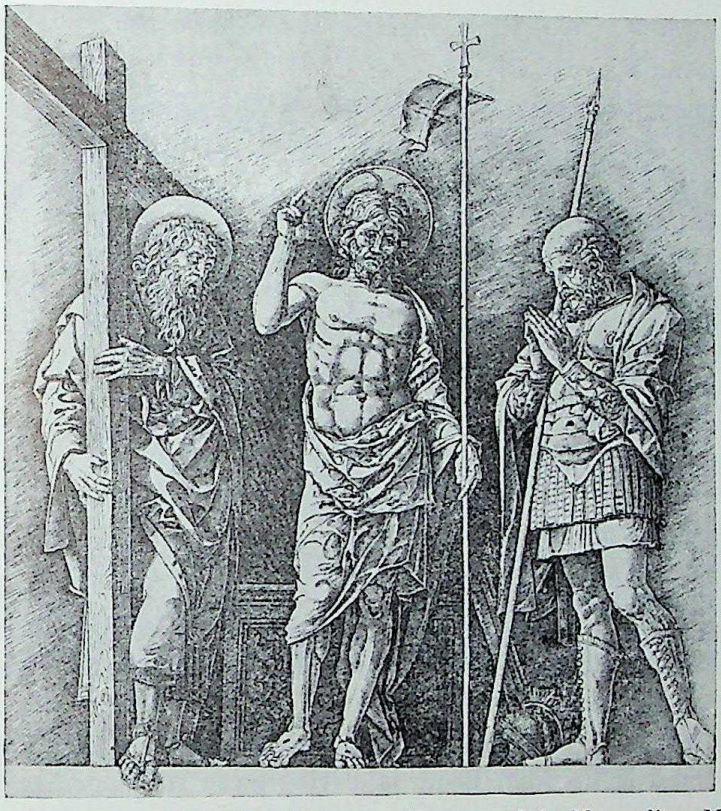


FIG. 78.—"The Risen Christ," by Mantegna. (*Courtesy of the Metropolitan Museum of Art.*)

Roman buildings, classical ornaments, and figures clothed in Roman togas or military garb. This combination of classical ideas with traditional religious motifs is illustrated by Mantegna's pictures dealing with the life of St. James in one of the churches of Padua.

BOTTICELLI. While the art of Mantegna nicely illustrates the zeal for classical study, that of Florence in the days of Lorenzo the Magnificent (*d.* 1492) was fully as humanistic and poetic. As patron of the arts, Lorenzo with his humanist ideas shaped the thought and expression of the artists of Florence. Probably no painter illustrates this fact more

eloquently than Botticelli (*d.* 1510), who executed many commissions for the Medici. His "Birth of Venus" is a poetical rendering of the classical myth which relates that Venus, born of the sea, was wafted onto the shores of Cyprus. His "Springtime" is an allegory. The scene is laid in an orange and olive grove where a foreground of greensward studded with flowers contains more than thirty-five kinds of plants reproduced with great exactitude. Venus stands in the center of a group of figures. Zephyr appears in the trees, driving forward Spring, from whose mouth gush flowers and plants. Before her treads Flora scattering flowers, while above is a flying Cupid shooting arrows. The three Graces

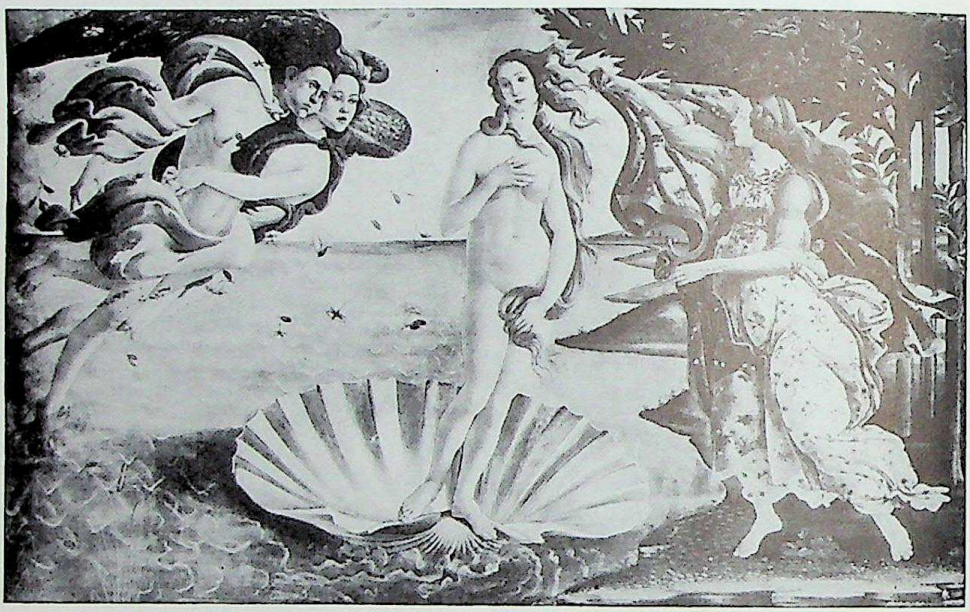


FIG. 79.—"Birth of Venus," by Botticelli.

dance at the right of Venus, and the entire procession, led by Mercury with a wand in his right hand, is driving away the lingering darkness of winter.

HIGH RENAISSANCE: LEONARDO DA VINCI. The period usually called the High Renaissance represents the culmination and combination of previously developing tendencies in art, literature, thought, and social customs and includes the careers of three great artists, Leonardo da Vinci (1452–1519), Michelangelo (1475–1564), and Raphael (1483–1520). The first of this triumvirate, Leonardo, produced the noblest creation of the art of the Renaissance. Born in Tuscany, he was brought to Florence, where he made excellent progress as an apprentice in the arts. He studied assiduously, developing a wide knowledge that soon attracted the attention of Lorenzo the Magnificent, who was ever on the watch for promising youths.

Leonardo was sent to Milan to execute a mammoth equestrian statue of Francesco Sforza, who had died in 1466. In preparing to execute the statue, Leonardo made minute studies of the anatomy of horses. He wished to produce a greater statue than Donatello's "Gattamelata." Unfortunately, the duke of Milan gave him so many tasks that he was never able to carry out the project. The vast statue was molded and set up, but never cast. Only from drawings are we able to form some opinion of it. Perfect knowledge of anatomy enabled Leonardo to give living movement to the horse as well as to the rider.

The goal of psychological unity was completely realized by Leonardo in the "Last Supper," painted on the walls of a monastic refectory in Milan. The figures of the disciples are carefully drawn, showing the individual reactions to the Lord's shocking statement that one of the band will betray him. Toward such psychological unity artists had long been tending, but much careful study and laborious experiment were necessary before they could master its intricacies. To Leonardo belongs the credit of solving this problem.

Returned to Florence, Leonardo produced a masterly portrait, the "Mona Lisa." The subject is seated at an angle of about forty-five degrees. Something has attracted her attention; her head is turned toward the beholder, and her eyes are fixed upon him. A melancholy smile dimly lights her countenance; the artist has represented his subject in one of her fleeting moods. The psychological portrait was an artistic form brought to perfection by Leonardo and henceforth was universally imitated.

Equally famous is his "Virgin of the Rocks," known from two originals, one in London and the other in Paris. Leonardo was especially fond of the triangular arrangement of figures, a device repeatedly employed by subsequent painters. The Virgin is seated. She rests her right arm affectionately upon the shoulders of John the Baptist; her left is extended over the head of Jesus. This is an example of the artist's facility in executing the most difficult foreshortening. Behind the child Jesus is seated an angel. The forms of the children, particularly that of Jesus, constitute a most successful study of the anatomy of infants; no other artist of the Renaissance had rendered children so well. The figure of the Virgin possesses an ideal femininity, which also was characteristic of Leonardo, who seemed to associate ideal beauty with the feminine form. Another feature of this as of other paintings by Leonardo is the magical effect of light and shade, or chiaroscuro. Artists from Giotto to Leonardo had seen that the eye observes objects in light and shadow. Experimenting with this problem, they made more or less successful application of their observations. But Leonardo was the first to paint objects as if standing in a flood of light. He therefore painted the

subtle gradations of light. The more prominent the parts, the brighter the light; the less prominent, the deeper the shadows. The effect was magical; thenceforth, chiaroscuro became a constant device with Italian painters.

Leonardo truly was a universal genius. Interested in everything, he investigated the anatomy of plants, animals, and birds. He made plans

FIG. 80.—"Mona Lisa," by Leonardo da Vinci. (*Courtesy of the French Information Center, Inc.*)

for canals, locks, and docks. His engineering studies include those for the construction of forts, guns, airships, spinning machines, chain belts, and other mechanical devices. He knew more about human anatomy than any student of his own or previous times. He drew muscles, bones, and nerves with artistry and exactitude. He studied fossils and anticipated a few of the theories of modern geologists. Every topic connected with painting is discussed systematically in his *Treatise on Painting*.

MICHELANGELO. Michelangelo, second of the geniuses of the High Renaissance, was essentially a sculptor. Born in Tuscany, he early went to Florence where he, too, attracted the attention of Lorenzo the Magnificent. After Lorenzo's death, Michelangelo went to Rome, where he lived until his death in 1564. He admirably combined the medieval religious conviction, the energy of the Renaissance, and the idealism of Greco-Roman sculpture. His marble "Pietà" in St. Peter's in Rome combines traditional Christian sentiment with classical idealism. His "David," more rugged, clearly indicates the nature of the artist's future work. The heroically proportioned boy, gazing upon the distant Philistines, is shown about to whirl the deadly stone. In this statue, we note that one idea—slaying Goliath—dominates in both facial expression and bodily action.

In Rome, Michelangelo decorated the ceiling of the Sistine Chapel, a surface of about six thousand square feet, painting upon it 394 figures, many of them as much as ten feet high. The central series forms nine panels illustrating the story of Creation to the time of Noah. On each side are decorative figures, the "Athletes," revealing the artist's matchless skill in depicting the human form in its difficult poses. On the turn of the vaulting of the ceiling are painted Hebrew prophets and pagan sibyls who had foretold the coming of the Messiah.

Some of Michelangelo's most grandiose sculptural conceptions were prepared for the projected tomb of Pope Julius II, and for those of the Medici in the church of San Lorenzo in Florence. Of the first, several uncompleted statues have been preserved, including the colossal figure of Moses, which now stands in the church of St. Peter in Chains. This is a figure of gigantic proportions, a frame so mighty as to overpower observers. For the Medici tombs only two superb Medici statues and four figures—Day and Night, Dawn and Twilight—were made. Each of these four restless giants seems to move under the impulse of some sad thought.

Michelangelo's greatest work in paint is the "Last Judgment" behind the altar of the Sistine Chapel. As on the ceiling above, painted twenty-five years before, the painted figures are all too muscular and powerful. The figure of Christ judging the damned, for example, is unpleasant because of its almost brutal proportions. Preoccupation with anatomical structure and excessively vigorous action were defects that were accentuated as the artist grew older.

RAPHAEL. Third of the geniuses of the High Renaissance was Raphael, a personality very different from Leonardo or Michelangelo. Born in 1483 in Urbino, he was taught painting by masters not well acquainted with the strides art was making in Florence. Later he went to Perugia to study with Perugino, who, unfortunately, was also unaware of the rapid progress of Florentine painters. Raphael was an impres-

sionable youth who readily learned from other artists. When he left Perugia, he painted much like Perugino; in fact, that master's peculiarities never entirely vanished from Raphael's canvases. For years, Raphael filled his pictures with spacious backgrounds, in which are undulating hills, meandering streams, tall and slender trees with feathery branches, and the distant horizon meeting the earth in an indistinct haze.

FIG. 81.—"Sistine Madonna," by Raphael. (*Courtesy of the Metropolitan Museum of Art.*)

His figures retained the rounded faces he had learned to admire in Perugino's paintings. But when he visited in Florence, Raphael saw the marvelous work of Leonardo and Michelangelo and realized that he still had many things to learn.

Raphael studied Leonardo's psychological and anatomical methods. Admiring his conception of beauty, he began to appropriate his ideas, and a new era commenced in his career. His matchless Madonnas now

began to appear, so greatly admired by discriminating Florentines and every generation since. Who has not felt pleasure in contemplating the "Madonna of the Grand Duke," the "Hermitage Madonna," the "Madonna of the Field," the "Madonna with the Goldfinch," the "Fair Gardener," or the "Sistine Madonna"?

Called to Rome in 1508, Raphael was ordered by Pope Julius II to decorate the walls of the rooms near the Sistine Chapel. In one of these, the Camera della Segnatura, Raphael painted two frescoes on opposite walls that deserve special attention. The first, popularly called the "Disputa," depicts the truth taught by the church as illustrated in the Holy Eucharist. It is divided into two groups, a company on earth admiring the consecrated wafer in a monstrance and another in heaven surrounding the Father, Son, and Holy Spirit. This picture is a magnificent panorama eloquently proclaiming the Christian conception of life and death. The picture opposite, the "School of Athens," shows the philosophers of the classical past assembled under the vaults of a spacious building such as Renaissance architects liked to conceive. The counterpart of the "Disputa," it symbolizes science and philosophy as they were understood at the close of the Middle Ages. The "Disputa" proclaims the divine science of salvation and the Christian conception of life; the "School of Athens" tells of the philosophic lore that man has produced through his reason, unassisted by revelation.

Raphael also painted pictures in the rooms adjoining the Camera della Segnatura as well as in other places. But we can consider only the matchless portrait of Baldassare Castiglione, the author of *The Courtier*, a masterpiece of psychological expression showing that Raphael had appropriated the ideas of Leonardo. But Raphael found it hard to digest all the ideas of Michelangelo; perhaps he did not live long enough to do so, for he died in 1520. At any rate, he failed to handle successfully the vigorous action and heroic size typical of Michelangelo's figures. Some of his later pictures, for example the "Fire at Rome," in a room adjoining the Camera della Segnatura, are characterized by largely meaningless action.

THE VENETIAN PAINTERS. Italian art of the Renaissance to the ascendancy of Michelangelo was chiefly the creation of Florentine genius. But by 1475 Venice was producing a distinctly native art. Life in Venice among the governing commercial oligarchy was a splendid affair; families were rich, lived in luxury, and liked colorful public festivals. Artists depicted these aspects of Venetian life. They were particularly successful because of the new oil color they introduced. Possessing distinct advantages over tempera painting, it permitted subtle gradations of light and shadow and enabled artists to reproduce the shimmer of silk, the rich sheen of velvet. the glow of jewels, and the fine texture of

skin. Venetian art well illustrates the voluptuousness of life in the Adriatic republic.

Venetian painters employed all the subtleties of the masters of the High Renaissance—chiaroscuro, balanced composition, psychological unity, foreshortening, and exact anatomy. But they added the witchery of color. Giorgione (1478–1511) was the first Venetian to feel the charm of humanist classical themes, which he painted in lucent colors like the soft glow of satin. Titian (1477–1576) carried these characteristics to logical completion, painting humanist mythological scenes and portraits. His most famous religious picture perhaps is the "Assumption of the Virgin," in which the Virgin is rising amid a bevy of angels. Above her is the Father in a pearly haze of glory while on the earth stand the apostles gazing upward. Tintoretto (1518–1594), more vigorous than Titian, possessed all the excellences of that master. Veronese (1528–1588) catered especially to the tastes of Venetians. His pictures are grandiose, and their composition is complex. He delighted in painting public ceremonies, filling his pictures with handsome men clothed in satins and velvets, women with fair skin, dressed in the finest of costumes, sumptuous palaces, and, overhead, spacious blue skies.

Renaissance painting in some respects attained its fullest maturity in Venice. The secular note, for example, was more fully a feature of Venetian than of any other Italian painting. The proportion of purely secular, that is, nonreligious, themes constantly increased. Landscape played a more prominent part even in religious pictures. The numerous paintings portraying public festivals, in which Venetian life was so rich, further emphasized the secular character of Venetian art. The humanist note and the great canvases illustrating vast mythological themes accentuated the break with religious tradition. A good example is Tintoretto's "Bacchus and Ariadne." Portrait painting, likewise a prominent feature in the history of Venetian art, also centered attention on affairs of this world rather than the next. People liked to have portraits of relatives and friends; and such pictures were sought as eagerly, perhaps more eagerly, than the Madonnas.

Italian Architecture of the Renaissance. The age of the Renaissance naturally produced a new style of architecture. Ideas drawn from ancient Roman buildings were applied to chapels, churches, and palaces. Decorative design likewise was copied from ancient buildings; everywhere we find a revival of such motifs as the hawk's beak, egg and dart, leaf and dart, olive and reel, and honeysuckle. Furniture, whether secular or religious, also followed the classical tradition.

The first architect to adopt classical Roman conceptions was Brunelleschi (*d.* 1446), a Florentine. He was a versatile artist, responsible for a number of splendid buildings that still grace the city of Florence. The

dome of the cathedral, which dignifies the sky line, is 138½ feet in diameter. Brunelleschi built it after the opening over the crossing of the nave and transept had remained unroofed for nearly a century, using a method of construction different from that for the domes of Byzantine churches, many examples of which were to be found in Italy. He built a double dome without centering—the inner, saucer-shaped of stones

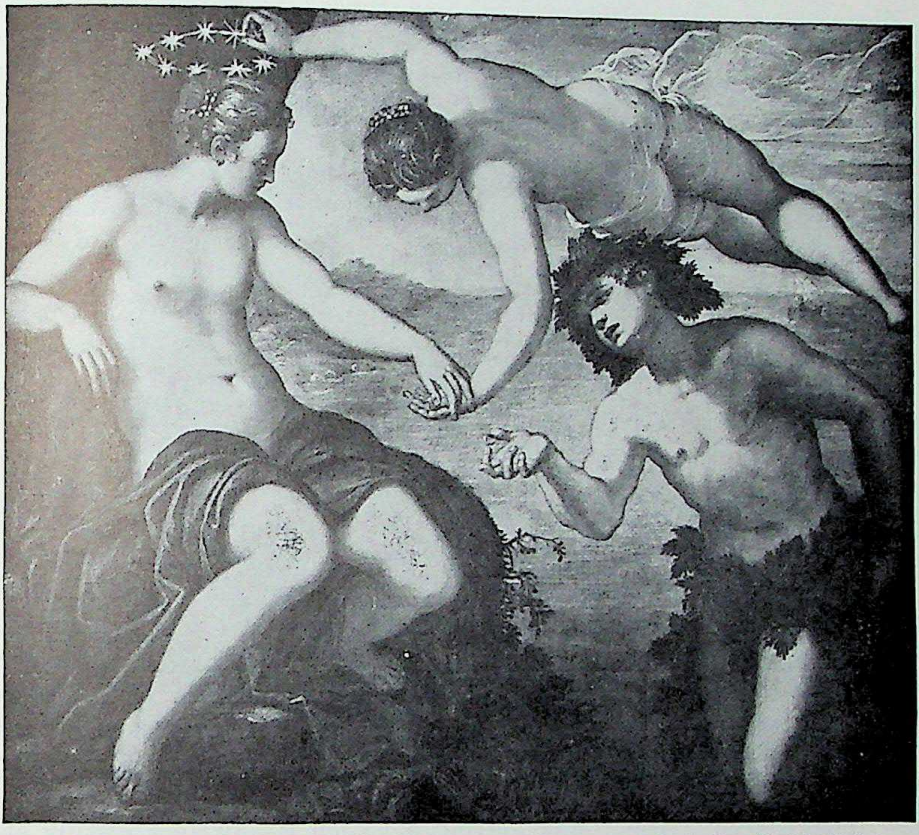


FIG. 82.—"Ariadne and Bacchus," by Tintoretto. (*Courtesy of the Italian Tourist Information Office.*)

carefully fitted together, the outer, Gothic in line on an octagonal drum—an original creation yet in emulation of classical building. Another landmark by Brunelleschi is the Foundling Hospital, built for the silk guild. The façade fronting the square is faced with a porch supported by a long row of Corinthian columns, in the spandrels of which are Andrea della Robbia's famous terra-cotta *bambini*. As famous is the Pazzi Chapel adjoining the church of Santa Croce, which has a dome resting on squinches supported by columns of classical design. The porch is composed of a colonnade carrying a horizontal entablature, a feature that was to become popular. In most of these structures, Brunelleschi gave

evidence of having studied classical construction. In general, however, he seems to have found his inspiration chiefly in late Roman and early Christian buildings.

Probably the most remarkable architectural type developed in Florence at this time was the domestic palace. It combined medieval conceptions with new ideas borrowed from classical Roman buildings. These palaces were constructed in three stories arranged around a court open to the sky. The second and third contained the living rooms. A stairway led from the ground floor to the second story. A large doorway opened from the street into the central court, usually decorated with a statue. Such palaces looked like fortresses, for the blocks of stone were thick and the windows were barred with iron. The Medici palace, constructed for Cosmo de' Medici by Michelozzo di Bartolommeo (*d.* 1472), was the first domestic palace to illustrate the new trend. Its horizontal lines and massive cornice are reminiscent of classical buildings.

The Rucellai palace constructed a little later by Leon Battista Alberti was more definitely classical. The facing of each story is broken by pilasters, a device never employed in the Middle Ages but borrowed from such classical buildings as the Roman Colosseum. Alberti (1404–1472), a Florentine like Leonardo da Vinci was a universal man, a Humanist, scholar, painter, sculptor, writer, and architect. His is one of the first names associated with the copying of classical motifs that began with the middle of the fifteenth century. He revived the Greek-cross plan, with four equal arms. This thereafter became so popular that the Latin-cross plan of Romanesque and Gothic churches was often abandoned. Another of his innovations, greatly admired and widely imitated, was the modeling of façades of churches after the triumphal arches of Roman times. The central doorway was wide and high, those on each side were smaller. There are few greater names in the history of architecture than that of Alberti.

The palaces of Rome built during the High Renaissance occupy an extremely important place in the history of domestic architecture. The general idea of three stories and a central open space was retained, as in the Farnese palace built by Antonio da Sangallo (*d.* 1546). A more elaborate style of palace architecture was evolved by Bramante. Feeling that one pilaster between two windows produced a monotonous effect, he substituted double columns in the second and third stories while the ground story remained plain, made of flat stones with beveled edges. Raphael, an architect as well as a painter, continued this style with some changes. All these features were eagerly appropriated by the Venetians. The Grimani palace, for example, had double engaged columns on the second and third stories and pilasters on the first. Jacopo Sansovino (*d.* 1570) elaborated this style, using classical motifs in profusion and

overloading the building with highly decorative ornament. Many have criticized Sansovino's buildings, but they pleased Venetians.

Donato Bramante (1444–1514), the architect, worked in Rome during the earlier years of the High Renaissance (see above). He was steeped in archaeological lore, especially that of architecture. Admiring

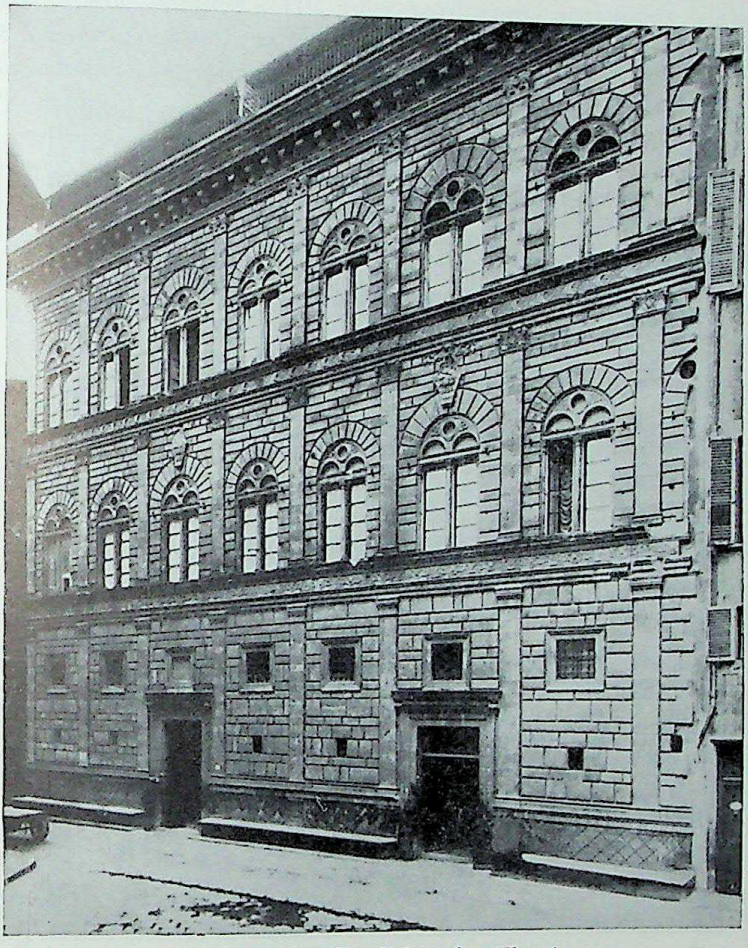


FIG. 83.—Rucellae Palace, by Alberti.

such circular temples of classical Rome as the Pantheon, he built a small round church, the Tempietto, not far from the Vatican. It is covered by a dome resting on a tall drum. Bramante's influence on the history of classical revival is as great as that of Alberti.

Of all buildings in Christendom none is more impressive than St. Peter's Church in Rome. The Emperor Constantine (*d.* 337) erected a stately basilica over the tomb of St. Peter, following the model employed in early Christian churches. Throughout the Middle Ages, this edifice was

a center of Christian life. Here the emperors of the Holy Roman Empire were crowned, and after 1400 it was the fixed abode of the popes. But the venerable building seemed ready to collapse, and plans were formed to erect a new one. Julius II, Pope from 1503 to 1513, decided to replace it with the most grandiose house of worship in Christendom.

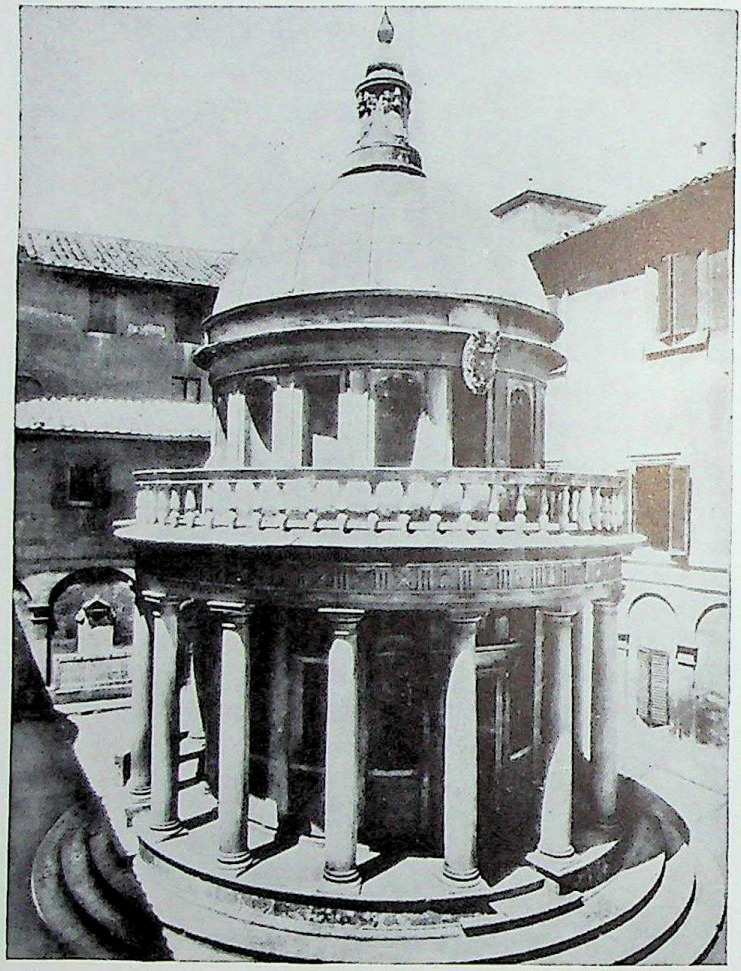


FIG. 84.—Tempietto, by Bramante. (*Courtesy of the Metropolitan Museum of Art.*)

No brief description can possibly furnish an adequate idea of the monumental structure of the new St. Peter's. Its nave is 80 feet in width. The central crossing is covered by one of the greatest domes in existence, 137½ feet in diameter; its top is 405 feet from the ground. The pilasters on the exterior wall are 108 feet in height. The construction of so mighty a pile required many years, and the most illustrious architects of the Renaissance were associated with it—Bramante, Raphael, and Michelangelo. The last-named planned the dome but left it

unfinished upon his death in 1564. The impressive courtyard, enclosed by circular colonnades, was added by Bernini in the next century.

The grandeur of Renaissance architecture finds its culmination, however, in the work of Palladio of Vicenza (*d.* 1580). An enthusiastic student of Roman antiquities, he developed a style at once classical, sumptuous, and popular. His most significant monument is the town hall of Vicenza, originally a medieval Gothic structure to which Palladio gave a classical appearance. In this building, he developed what is known as the "Palladian motif," the employment of a minor within a major order in the same composition. The arches between the columns of the major order are carried by smaller columns, which bear the arch inward from the larger columns. Palladio elaborated his building designs, adopting the ideas of his predecessors. Thus was evolved an architectural style that pleased the luxurious and ornate tastes of the late Renaissance.

Renaissance Art in Central and Northern Europe. People in Spain and northern Europe were slow to adopt Italian styles; Gothic ideas long remained popular. The Flemish artist Memling (*d.* 1495), for example, was scarcely influenced by the triumphs of such Florentine contemporaries as Botticelli. But as the sixteenth century dawned, Renaissance artistic ideas spread into Germany and to Flemish Antwerp; among the artists of that busy city, Quentin Massys (1466–1530) was the most famous. It is easy to see in his paintings the influence of Raphael, Michelangelo, and other artists of the High Renaissance. On the other hand, Massys never forgot the lessons he had received from Flemish teachers. Consequently, his pictures contain a wealth of detail dear to Flemish artists and foreign to Italian masters. One of his greatest pictures, the "Entombment," reminds us of the work of Rogier vander Weyden, whose specialty it was to portray weeping Virgins. This union of native Flemish with Italian artistic ideas now gained favor and completely changed the artist of the Netherlands. From Antwerp this influence readily passed to other parts of central and northern Europe.

German art before 1500 was, like the Flemish, essentially Gothic in theme and manner. But Italian influences eventually began to be felt. The first great personality in the history of German art of the Renaissance was Albrecht Dürer (1471–1528), born in Nuremberg. A man of insatiable curiosity, he traveled to Italy to see the artistic creations of masters like Mantegna. He also visited the Netherlands and kept a journal of what he saw and heard there. Although he had learned much from masters like Mantegna, his individuality never was submerged by the perfection of Italian masters. He combined in remarkable degree German ideas with the Italian manner. His "Self-Portrait" com-

pares favorably with the psychological portraits painted south of the Alps. But his finest paintings probably are two panels representing four apostles, John and Peter, and Mark and Paul; their sharply individualized forms well reveal the master's mature skill. These panels were the artist's gift to the city of Nuremberg, where they were placed by the authorities in the town hall. Dürer painted other pictures, made many woodcuts, and produced excellent etchings.

The next notable figure in the history of German painting was Hans Holbein the Younger (1497–1543) of Augsburg. His father, Hans Holbein the Elder (1460–1524), was an able painter who felt the

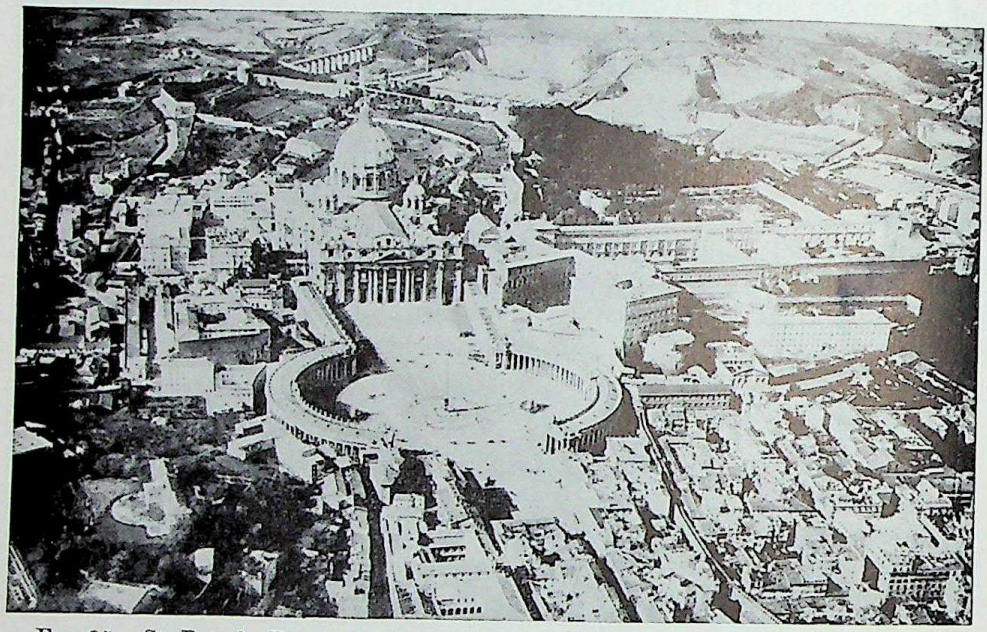


FIG. 85.—St. Peter's, Rome, air view. (*Courtesy of the Metropolitan Museum of Art.*)

subtle charm of Italian methods, but his greatness was overshadowed by that of his son, whose name deserves to be mentioned along with that of Dürer. The latter, a more robust intellect showed a wider range of interests, but Holbein was no doubt a greater painter and illustrator. Visiting Italy, he made careful note of the technique of its artists. His portraits show how well he mastered their ideas; their faces are masterpieces of psychological study. The most famous of his pictures is the Madonna painted for Burgomaster Meyer of Basel. A masterpiece of composition, it combines whatever was vital in the old German spirit with the charm of the Italian manner.

It would be no difficult task to extend this account of northern Renaissance art to include many more notable artists. But they all were characterized by one common feature—admiration for the methods

of Italian masters. This does not mean, however, that the artists of northern Europe were slavish imitators. Many of them successfully combined the best of the foreign manner with their own style. There was one painter, however, who refused to succumb to the Italian manner —the Netherlander Breugel the Elder (1520?–1569). He visited Italy and undoubtedly studied the masterpieces of Raphael and Michelangelo

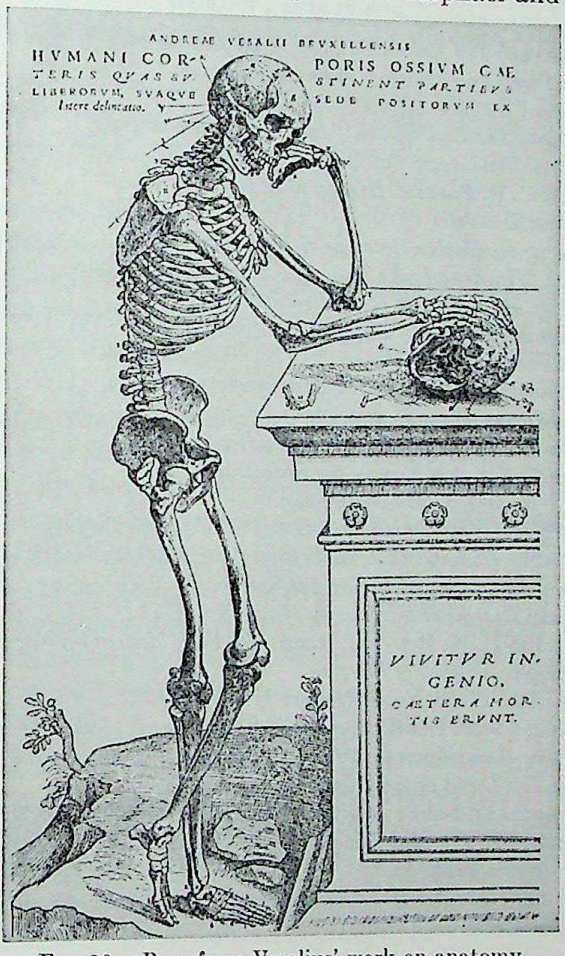


FIG. 86.—Page from Vesalius' work on anatomy.

but, on his return, continued to paint rural and peasant scenes true to Flemish tradition. No other great painter in northern Europe remained so staunchly devoted to native custom, so charmingly naïve. Italian influences are discernible in some of his landscapes, but his scenes of Flemish peasant life and his larger pictures such as the "Massacre of the Innocents" reveal little Italian influence.

Our next task is to survey the epochal revolution in man's conception of the earth caused by the voyages of Vasco da Gama, Christopher

Columbus, and other intrepid explorers. Significant as humanism and the new art of the Renaissance were in the intellectural history of Europe, the consequences of the voyages of discovery were at least as momentous, for they ultimately transformed every aspect of life, social, political, and economic, as well as artistic and religious.

FOR FURTHER READING

BERENSON, BERNHARD: *The Italian Painters of the Renaissance*
BODE, WILHELM: *Florentine Sculptors of the Renaissance*
BOULTING, WILLIAM: *Women in Italy*
BURCKHARDT, JACOB: *The Civilization of the Renaissance in Italy*
CARTWRIGHT, JULIA: *Baldassare Castiglione, The Perfect Courtier*
CHASE, G. H., and C. R. POST: *A History of Sculpture*
CRUTTWELL, MAUD: *Donatello*
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Chapter XXXIII

AGE OF DISCOVERY AND EXPANSION

The effects of Columbus's expedition were not confined to science or to commerce. His was a most revolutionary discovery, and its intellectual results were as great as its practical ones.—G. B. Adams

FEW events in the history of civilization have been fraught with such momentous consequences as the voyages of discovery. By the close of the Middle Ages the region known as Europe, the seat of medieval civilization, was confined to that part of the continent which lies west of Russia. Europeans knew little about Asia beyond the Near East. They had only vague ideas about the route to China and India and a slight acquaintance with northern Africa including Egypt. The torrid sands of the Sahara effectually barred travel to the south. Yet in the span of one generation the continental nature of Africa was revealed, Asia was opened to direct commercial exploitation, and two continents—North America and South America—whose very existence had hardly been suspected were discovered and colonized. Although its existence was rumored during the sixteenth century, Australia was not actually discovered until after 1600. These voyages of discovery form the beginning of what we may call the Europeanization of the world. The two Americas became an annex of European culture; Asia and Africa more and more became economic provinces of Europe. The problems created by these events are still with us; for good or ill, they have conditioned the civilization of the past four centuries.

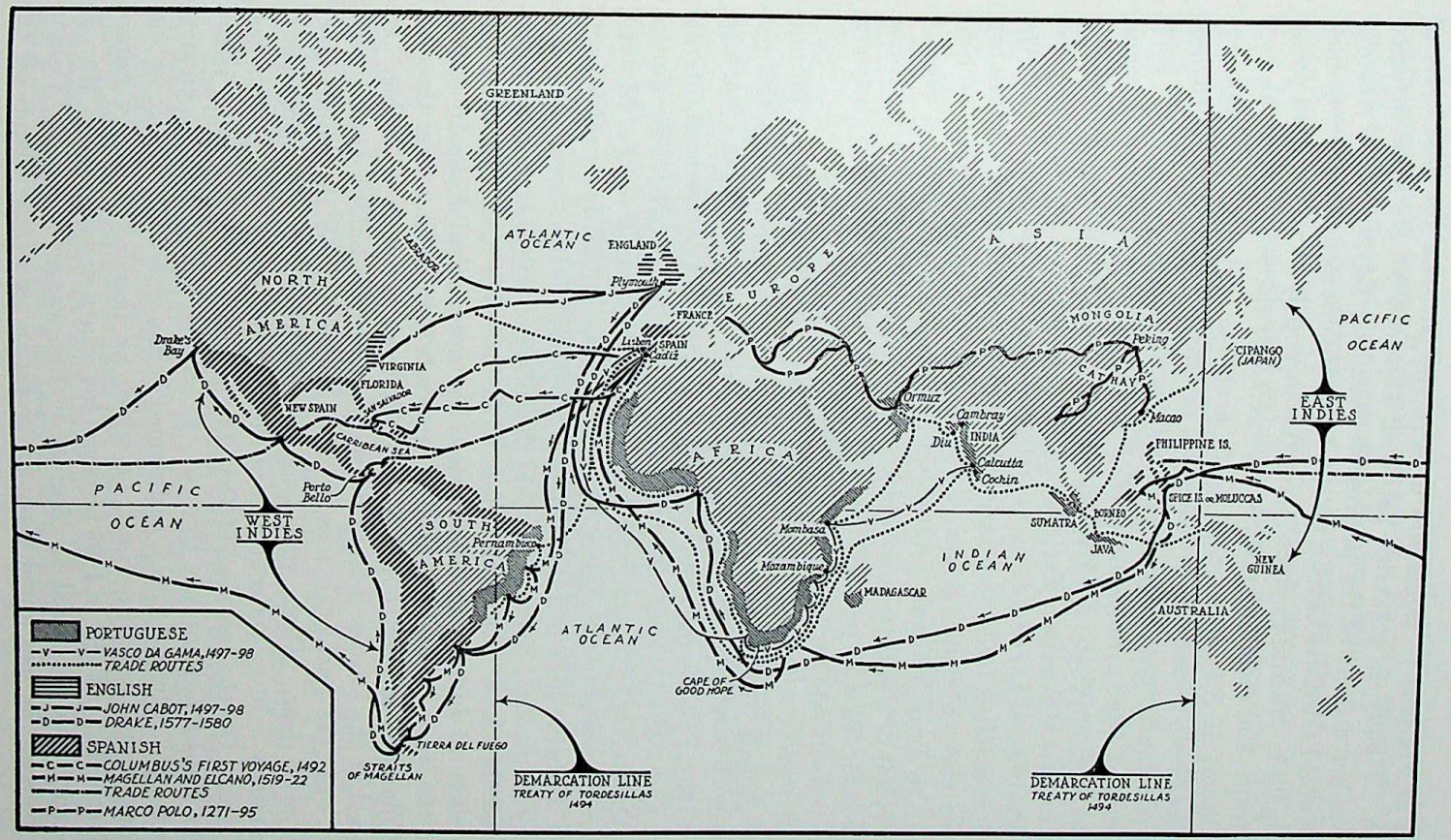
Portuguese Colonial Enterprise in Africa and India. Portugal, which for centuries had played a modest part in the affairs of Europe, now led the way in the discovery of new lands. The energies of the country had heretofore been taxed to expel the Mohammedan Moors, a task completed in the twelfth century. King John I, who ruled from 1385 to 1433, had warred against Castile and to do penance for fighting Christians had proposed to "wash his hands in infidel blood." He announced a crusade to snatch Ceuta on the African shore opposite Gibraltar from Moorish hands. This city was the key to the Mediterranean, the door to Africa, from which the Moors had advanced in 711 to conquer Spain. King John's conquest of Ceuta in 1415 was greeted with much applause in Portugal. This was the beginning of a deadly

assault on the privileged position of the Mohammedan world, which barred the road to Christian expansion and prevented Christian merchants from going directly to oriental markets.

Henry the Navigator (*d.* 1460), son of John I, was the moving spirit of this endeavor. The Mohammedan enemy was to be driven back by an attack on the west coast of Africa. He also hoped to establish connection with the mythical realm of Prester John and the East of fabled wealth. Prince Henry studied maps, collected geographical lore, and built an observatory at Sagres on the southern coast of Portugal. The Madeira Islands, although discovered in the previous century, were occupied in 1419. The Azores were colonized soon after, but attempts to seize the Canary Islands, which belonged to Castile, failed. Gradually, Portuguese ships extended their exploration to Cape Bojador. The Cape Verde Islands were discovered and explored, and by 1460 the Portuguese appeared on the Guinea coast. They sought gold, which was known to come from this region and from the valley of the Niger River. Now also began an active slave trade, approved at first because slavery brought Christianity to negroes. Soon, however, the economic aspect of this trade smothered missionary altruism. Commerce in human beings throve mightily; it finally became a prime factor in the economic evolution of the New World.

For the moment, men believed that Africa's southernmost point had been reached, that the head waters of the Nile had been found. But the continent stretched ever farther southward. Undaunted, the Portuguese continued their explorations until 1486, when Bartolomeu Dias sailed around the Cape of Good Hope and far enough beyond to make certain that this was the extreme southern point of Africa. Next an expedition was prepared under Vasco da Gama (*d.* 1524). Four vessels were equipped, munitions were placed on board, and Da Gama was given letters addressed to Prester John and the ruler of Calicut. The fleet sailed on July 8, 1497, spent Christmas Day at Natal, called at Mozambique and other places where Arab merchants carried on a lively trade, sailed across the Indian Ocean guided by an Arab pilot, and entered the roadstead of Calicut on May 20, 1498. A rich cargo of spices and precious stones was obtained, and the fleet returned home with the loss of one ship and a third of the crews.

Instinctively, the Arabs and the people of India saw the danger that threatened their monopoly and tried to prejudice the natives against the newcomers. Even on the African coast, Da Gama had felt their displeasure. The ruler of Calicut acted treacherously and plotted against him. Other expeditions followed, which still more embittered the Arabs. In 1505 Francisco de Almeida (*d.* 1510) was appointed viceroy of India by the king of Portugal. He was ordered to bring the



Map XXVII.—Age of Discovery, 1340–1600.

rulers of Malabar to terms and to seize the ports on the east coast of Africa. Finally, in a notable battle off Diu in 1509, his ships defeated the combined fleets of the princes of India and Egypt. This was one of the world's decisive battles, for it robbed Mohammedan traders of their monopoly in oriental products, gave this monopoly to a Christian power of Europe, and definitely marked the decline of the Semitic peoples.

Alfonso de Albuquerque (*d.* 1515) next was sent out to consolidate what had been gained and to establish a trading empire. The Portuguese fleet constantly cruised in Asiatic waters, seizing such strategic ports as Aden at the entrance of the Red Sea. Albuquerque took Hormuz on the Persian Gulf and Malacca on the Malay Peninsula and sent a fleet to the Moluccas. Factories, or trading houses, were established. The Portuguese government set up the *Casa da India*, or House of India, which controlled trade with India, directed the activities of the viceroy, policed the sea route around Africa, and kept other Europeans from sailing to India. Great wealth poured into Portugal; Lisbon became the capital of world trade as Venice had been in the previous centuries. Ships came from all parts of northern Europe, especially from Antwerp, to help distribute cargoes from the Orient.

Spanish and Portuguese Colonial Efforts in the New World. More romantic than the adventures of the Portuguese were the discoveries beyond the Atlantic, in which the Spaniards took the lead. Until 1492, Spanish rulers had been preoccupied with problems of internal peace and with the expulsion of the Moors. In that year, King Ferdinand and Queen Isabella seized Granada, the last vestige of the Moorish domination that had begun in 711. Hardly were the Moors subjugated when Isabella provided Christopher Columbus with three ships and ninety men to sail westward to find the unknown lands rumored to exist beyond the rim of the ocean and to enter into diplomatic relations with the rulers of India. The Portuguese had approached India by sailing from the west; Columbus hoped to approach it by sailing from the east.

Columbus set sail on Aug. 2, 1492, from the port of Palos. He stopped at the Canary Islands for repairs and then boldly steered westward over the uncharted seas. All was strange, and the sailors were filled with fear. There was danger of mutiny, but the commander dauntlessly held to his course until the fleet drew near the islands east of Cuba. On the morning of Oct. 12 the shores of a low-lying island of the Bahama group rose to view. Columbus landed, took possession of it for the rulers of Spain, and named it San Salvador. Next he discovered Cuba and then Haiti, on which he founded a colony named La Natividad. Early in 1493 he began his return voyage and on Mar. 14 entered the harbor of Palos. A great ovation was given him, for Columbus believed he had found Cipango, or Japan, and some islands off the

Asiatic coast. It was a magnificent voyage, the "one historical event which everybody knows." With Vasco da Gama's achievement, it wrought a revolution in man's geographical knowledge.

A period of busy exploration and colonization ensued. Columbus made three more voyages, during which he discovered many more of the West Indies, the mouth of the Orinoco River, and the coast of Central

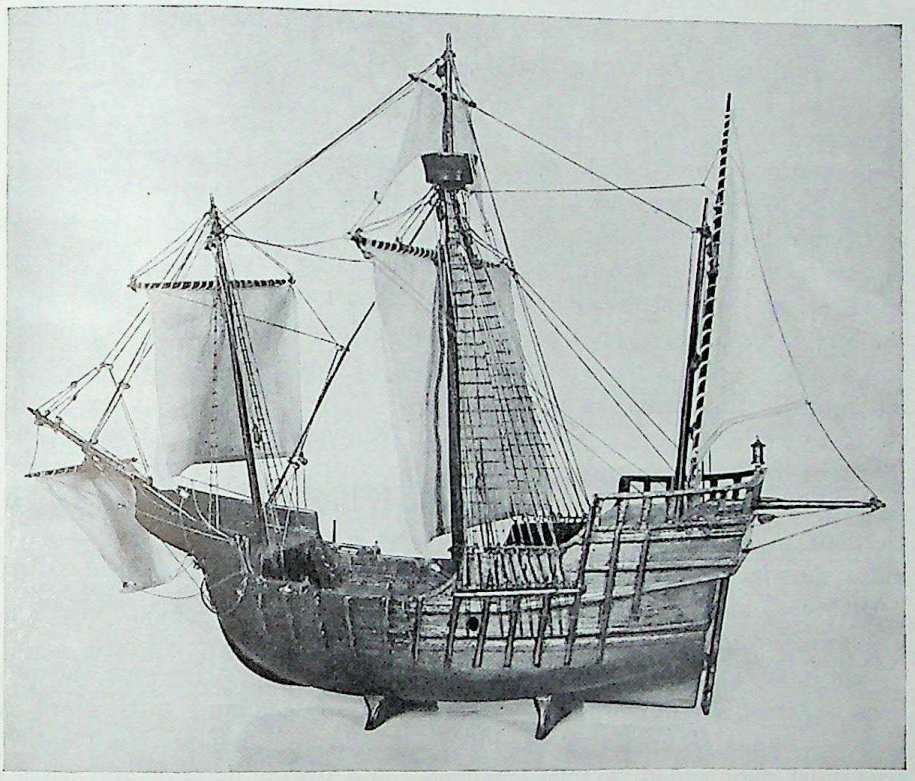


FIG. 87.—The *Santa Maria*, Columbus's flagship. From model. (*Courtesy of the Commercial Museum, Philadelphia.*)

America. Vainly he sought a passage to the Moluccas, which he thought lay near by. Columbus never realized that he had found two large continental land masses and that another ocean, the Pacific, much larger than the Atlantic, lay between the newly discovered lands and India.

The intrepid Vasco Nunez de Balboa explored the Gulf coast, crossed the Isthmus of Panama in 1513, and discovered the Pacific Ocean. The Portuguese Cabral (*d.* 1526), blown out of his course while on his way to Calicut in 1500, sighted the Brazilian coast, which he claimed for Portugal. Gradually, it became evident that these lands were not part of Asia but a new region. This was proved when in 1520 Fernando Magellan

(*d.* 1521), a Portuguese navigator under Spanish colors, sailed around the southern point of South America, steered across the Pacific, discovered the Philippine Islands, and reached Spain by way of the Cape of Good Hope. Men had long known that the earth was a sphere; from various arguments, scholastic philosophers had shown that this was so, but Magellan's feat was the first practical demonstration of the fact.

Spain and Portugal already faced each other in the islands off the eastern coast of Asia. Portugal hoped to secure a monopoly of Indian trade, but Spain, believing that Columbus had found the way to the East, had similar aspirations. To prevent war, the rival claims were submitted to the Pope as arbiter. In 1493, Alexander VI set a Line of Demarcation, from pole to pole, 100 leagues west of the Azores (later, moved to 370 leagues west of Cape Verde Islands) to separate Portuguese and Spanish colonial possessions. It gave all the Americas save Brazil to Spain, while India and the Moluccas fell to Portugal. So vague, however, was geographical knowledge of the newly found regions that the Spaniards believed that the Moluccas belonged to them. A conflict was avoided in 1529, when Portugal gave the Philippine Islands to Spain but retained the Moluccas for itself.

Meanwhile, Amerigo Vespucci (*d.* 1512), a Florentine, made some journeys to the West and published a description of the strange lands. Amerigo's name became even more famous than that of Columbus. A German named Waldseemuller published a geography in 1507, with maps showing the new lands, which now for the first time were called "America," after Amerigo Vespucci. The claims of the great explorer Columbus, who had died in 1506, were unjustly ignored.

English and French Exploration. Other countries also showed keen interest in exploration. Henry VII of England authorized a Genoese named John Cabot (*d.* 1508) to find new lands for the English crown. Cabot sailed in 1497, reached Cape Breton Island, and established the English claim to the eastern coast of North America. From 1502, Englishmen sailed regularly to the Newfoundland banks to catch cod. Portuguese, Spanish, and French fishermen had been doing this for some time.

King Francis I of France, who fought long and bitter wars with Spain, determined not to let his enemy secure all the new lands, in 1524 sent a Florentine navigator named Giovanni da Verrazano (*d.* 1527) to explore the North American coast. He was followed 10 years later by Jacques Cartier (*d.* 1557), who sailed around Newfoundland and along the shores of the Gulf of St. Lawrence as far as Quebec and Montreal. An attempt was made to establish a colony on the site of Quebec but this failed, and no further effort was made to establish colonies in Canada until the next century. Some French Protestants, or Huguenots, as they were

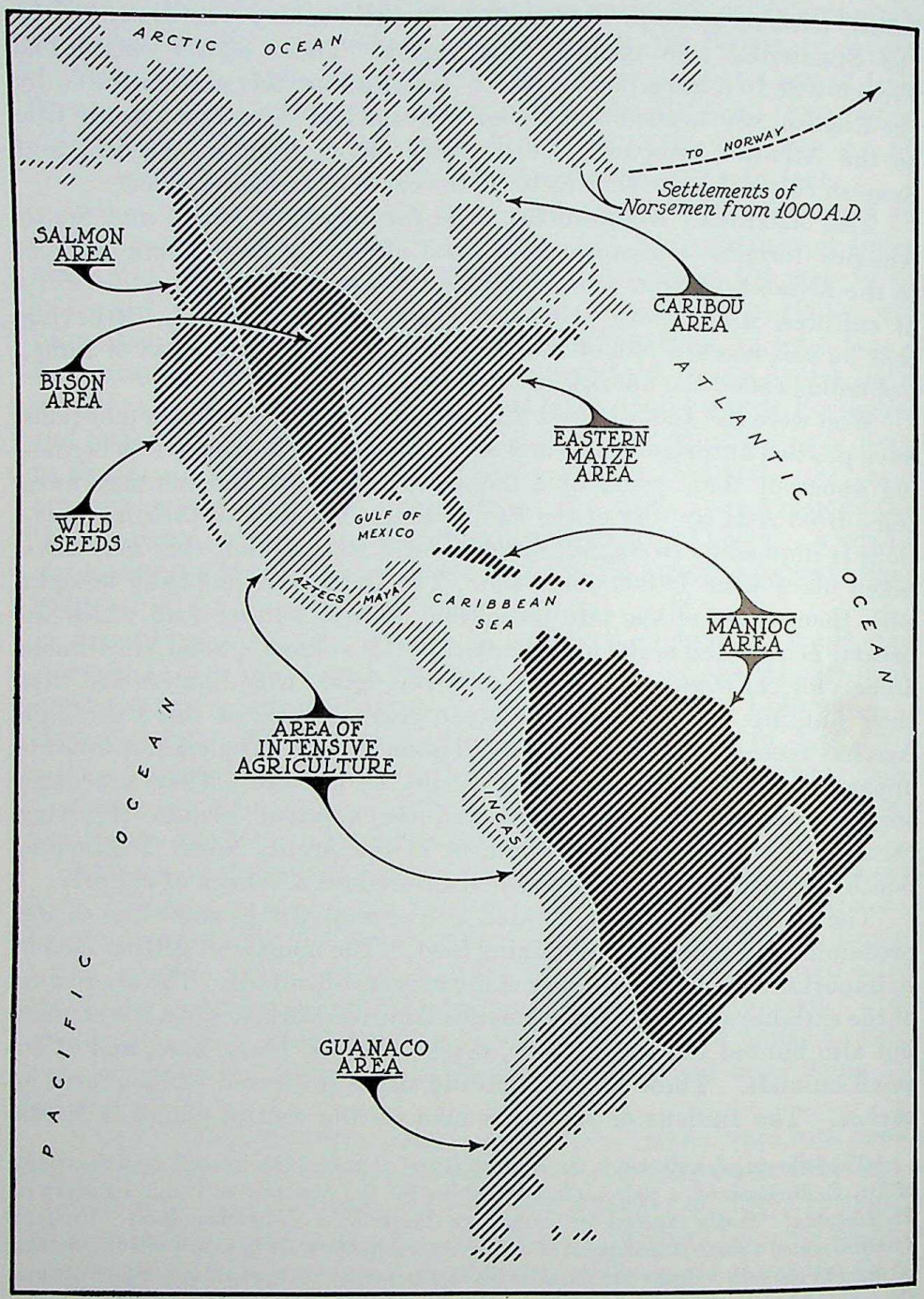
called, tried to settle in Florida, but the little colony was destroyed by the Spaniards, who claimed that region. These efforts established French title to a large part of North America, but this was contested by the English, who argued that Cabot's voyage had given them secure title to the Atlantic seaboard. This rivalry among English, French, and Spanish colonial interests was to be the cause of serious conflict.

THE AMERICAN ABORIGINES. The continents of North and South America forming a gigantic land mass stretching from Arctic regions to the Antarctic Ocean were inhabited by peoples possessing a diversity of cultures, some quite primitive, others quite advanced. Believing that he had reached one of the islands lying off the east coast of India, Columbus called the aborigines "Indians."

Who were the Indians, and whence did they come? These questions have puzzled anthropologists and archaeologists. Gradually it is becoming apparent that, being of a mongoloid race, the Indians may have come from Asia by way of the Bering Sea. The date of their immigrations is impossible to fix, but scholars have guessed that they may have taken place some 15,000 years ago. The Indians undoubtedly brought with them some of the late paleolithic hunting culture with which we became acquainted in the first chapters of this volume. Some remarkable archaeological evidence that the early aborigines were hunters and that their hunting tools were of the type characteristic of the Paleolithic Age has recently come to light at Folsom, N.M.[1] The earliest arrivals apparently had learned nothing about agriculture. They gradually spread over the two continents and the adjacent islands, adjusting themselves to their new environment in the Arctic, North Temperate, South Temperate, and Torrid zones, to produce a variety of cultures.

The aborigines may be divided into several groups according to the predominating method of obtaining food. The manner of getting food is so important that it determines many aspects of culture. The aborigines of the extreme north of North America depended largely upon the caribou but also hunted the moose, deer, musk ox, wood bison, hare, and other small animals. These roving, hunting tribes preserved caribou meat in caches. The Indians of the bison area on the central plains of North

[1] The following description in the *Literary Digest*, Oct. 10, 1936, is based upon the report of Dr. E. B. Howard, a paleontologist working for the Academy of Natural Science of Philadelphia: "Partly exposed by erosion lay the skeleton of the giant beast. Under a vertebra rested a stone javelin point of the prehistoric hunters, sharp as new after thousands of years in the soil. Under the shoulder blade was another; a third stood perkily between the forelimbs. At the base of a tusk were javelin points made of bone and a stone scraper such as might have been used for fleshing the hide. The skeleton was that of a mammoth elephant, an ice age brute bigger than modern elephants. Its kind once roamed all the continents of the Northern Hemisphere, reveling in wintry weather that lasted possibly a million years."



MAP XXVIII.—Hunting and agricultural groups among the American Indians.

America hunted the bison, or buffalo, and were commonly called "buffalo Indians." Their mode of life resembled that of their northern neighbors who hunted the caribou. They manufactured pemmican by pounding dried meat to powder, then stored it in bags sealed with fat, which enabled them to preserve it for months. The southern part of South America supported a third type of hunting culture, the guanaco. This animal, closely related to the alpaca and llama, provided the aborigines with meat and skins.

A distinct Indian culture developed along the western coast of North America from San Francisco Bay to the Arctic Ocean. This region may be called the salmon area because the salmon were in the habit of coming in great schools into the rivers in order to spawn. The aborigines of this region as a rule had no tribal organization and lived in more or less permanent villages along the banks and inlets of rivers. The Quileute Indians of the Olympic Peninsula are a good example. They catch great quantities of salmon, which they preserve by smoking.

In the southwestern part of what is now the United States, chiefly California, Arizona, and New Mexico, there were few large wild animals, and fish were not nearly so accessible as in the northwest. Consequently, the aborigines of these regions did not become hunters or fishers but subsisted mainly upon acorns, roots, and wild seeds. For this reason, they have been called "digging Indians."

Far more important in their contribution to the white man's culture than the hunting Indians of the caribou, bison, and guanaco regions, the fishing Indians of the salmon areas, and the digging Indians of the southwestern part of what is now the United States were the agricultural aborigines. Those living east of the bison area relied upon maize, or corn, as it was generally called by the whites. Corn grows in a great variety of climates but best flourishes in warm lands and in deep, fertile soils. It was raised in great quantities along the western coast of North and South America from California to Chile. This latter region was characterized by a remarkably advanced and intensive type of agriculture. In tropical parts where the soil is very moist, corn cannot be grown. The plant upon which the aborigines of such regions relied was the manioc, more commonly called cassava.

So complex was the social organization of the agricultural Indians of the south that they possessed villages and even towns. They domesticated a large number of plants, which were readily appropriated by the white man. The following list is by no means complete: agave (or aloe), alligator pear (or avocado), cacao, chili pepper (or capsicum), cashew nut, coca (or cocaine), corn (or maize), gourd, guava, India rubber, Jerusalem artichoke, kidney bean, lima bean, manioc (or cassava), papaw, peanut, pineapple, potato, prickly pear (or Indian fig), pumpkin, quinine, squash,

sweet potato, tobacco, and tomato. Some of these plants, the potato, for example, were grown in Europe soon after the discovery of America and were destined to produce astonishing changes in the food habits of the European peasantry. Tobacco and coca were eagerly sought by Europeans before the close of the sixteenth century.

The aborigines domesticated a number of animals that had never been seen by Europeans. The llama was widely used by the Incas of Peru and Bolivia. Related to the alpaca and the guanaco, this animal carried burdens, its hair providing excellent material for the weaving of cloth, while its flesh was a common article of diet. The Incas did not use the llama as a milch animal, however. The alpaca produced a better grade of wool, today known as camel's hair. Domesticated bees were common among the Aztecs; in all probability, such domestication occurred independently of Europe or Asia. The dog was raised almost universally. In some places, as among the Eskimos and the Indians of the North American plains, dogs were used as beasts of burden. It is probable that the dog originally was brought from Asia, where it had been domesticated in late Paleolithic times. The American aborigines did not have cows, horses, sheep, goats, pigs, chickens, geese, ducks, or cats.

Mayan, Inca, and Aztec Civilization. Some of the aborigines had made considerable progress in civilization. The Mayas, for example, who lived in southern Mexico and in Central America, made original discoveries that duplicated the achievements of peoples living in the Eastern Hemisphere. They occupied Yucatán probably as early as the year 1000 B.C. At that time, they had already developed an advanced agriculture and possessed a lunar calendar that closely resembled calendars employed by earlier peoples of Europe and Asia. As early as 752 B.C. the Mayas began to develop a new calendar based upon solar reckonings. They calculated that the year contained 365 days, plus a fraction. Mayan astronomers also calculated the revolutions of the planet Venus. They associated malign or beneficent influences with the stars, thus duplicating some of the astrological theories of the Babylonians, which were later inherited by the Greeks and the people of the Middle Ages.

The Mayas likewise made remarkable progress in the arts. Before the Christian Era, they had begun to evolve an urban civilization—the first in the Western Hemisphere. This was due to the growth of population and the inevitable division of labor resulting from such growth, which in turn was caused by a flourishing agricultural life. Mayan cities were built of stone; their ruins in Yucatán, Guatemala, and Honduras attest the extraordinary progress of their culture. As practically no metals were to be found in Yucatán, the Mayas never developed a geniune metal culture. But they did construct temples of massive stones carefully fitted together and covered with elaborate picture writing

and carvings representing conventionalized plant and human forms. The temples sometimes were orientated according to the cardinal points of the compass. Associated with many of the temples were extensive, truncated pyramids, the flat upper surface being intended for sacrifices. The Mayas also possessed a literature; but this has almost entirely disappeared owing to the destructive Spanish conquest. In addition to these artistic monuments the Mayas made excellent pottery and cloths.

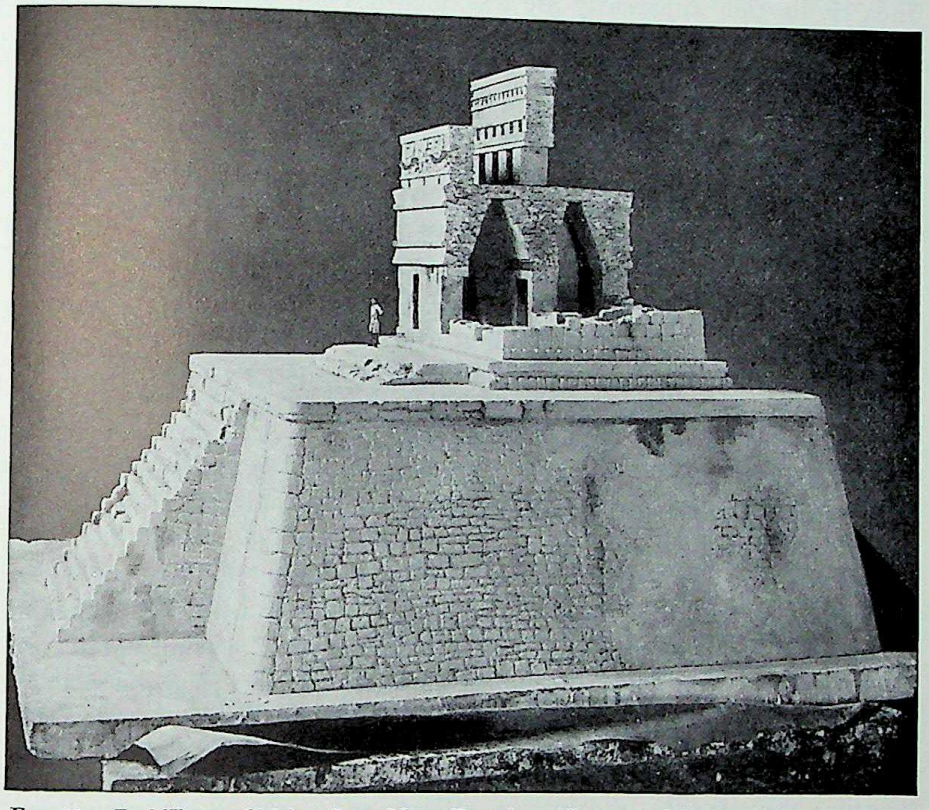


FIG. 88.—Red House, Chichen Itzu, Maya Temple. (*Courtesy of the American Museum of Natural History, New York.*)

Like other peoples who passed from a hunting culture to a soil-tilling culture, the Mayas had elaborate religious beliefs. Each human activity and every phenomenon of nature were presided over by special gods or sets of gods. The Mayas had a well-defined conviction that the world as well as man had been created. Magic flourished, and priests practiced divination. Human sacrifices were common in Yucatán, prisoners of war, slaves, and children being used for this purpose. The living victim's breast was opened with a knife, his heart was torn out, and the statues of the gods were anointed with the victim's blood. There was an

elaborate priestly organization, which exercised vast influence. Such were a few of the remarkable features of Mayan civilization, which reached its highest development about A.D. 450 to about 700. This period was followed by a decline until about the year 1000, when a striking revival of Mayan culture took place in Yucatán, lasting to about 1200.

The Incas lived in Ecuador, Peru, and Bolivia. The beginnings of Inca civilization apparently are less ancient than those of the Mayas. Originally the Incas were a tribe that began to extend its authority over neighboring tribes, thus forming an Inca realm. From 1400 to the Spanish conquest the great empire of the Incas was at its peak.

The remarkable cultural growth of the Incas goes back almost as far as that of the Mayas. Their main article of diet was the potato, which they seem to have been the first to domesticate. They also domesticated the alpaca and guanaco and used the llama as a beast of burden. The Incas living along the Pacific coast raised maize and developed complex systems of irrigation that enabled them to raise crops in desert regions. Trade developed, and towns sprang into existence. Their great cities like Machu Picchu, situated high among the Andes, were built of stone without the use of mortar or cement, which was unknown. The walls of their strong houses provided with splendid stairways reveal astonishingly skillful masonry; polygonal stones were cut with the utmost accuracy. The Incas also constructed roads that crossed rivers by means of suspension bridges made of stone.

Advanced as the Mayas were in craftsmanship, the Incas were in some respects their superiors. The Mayas developed some use of copper and made tools from this metal with the addition of a small amount of tin. Perhaps the science of making tools of bronze was developed by the Incas as early as A.D. 500 or 1000. In the working of gold, silver, and platinum, and the preparation of an alloy of gold, silver, and platinum called "tumbaga" used for tools, they were unsurpassed. It is well to emphasize that the Incas were the first American aborigines to develop metals and a civilization based upon the use of metals. They made excellent pottery without using the potter's wheel; the hammock also appears to have been an Inca invention. But with all their inventive genius, the Incas never developed the art of writing.

The Inca state was elaborately organized. At the head of it stood the ruler known as the Inca, regarded as a descendant of the sacred sun-god and worshiped in temples served by a numerous priesthood. Very rarely were there human sacrifices. Regarded as God and ruler, the Inca was omnipotent and owned all the land. There was no private property. The income of one-third the national land belonged to the Inca ruler, one-third to the temples and the priesthood, and one-third

to the people. Portions of land were assigned annually to each family according to size. Even the llamas were state property. The organization of the Inca state, therefore, was theocratic and communistic; it was a military despotism.

When the Spaniards arrived, southern Mexico was ruled by a powerful people known as the Aztecs who had long ago moved into this region from the plains to the north and subjugated the more highly civilized agricultural and city-dwelling people known as the Toltecs. This conquest resulted in the establishment of an Aztec state, which flourished about A.D. 1325. The Aztecs demanded from their subjects tribute in the form of human beings, whom they sacrificed to the gods. The Aztec state was generally disliked because of its violence and cruelty toward subject peoples, a resentment that paved the way for its easy destruction by the Spaniards.

Older theories advanced to explain the rise of the remarkable cultures of the Mayas, Incas, and Aztecs are now known to be erroneous. One theory still popular is that elements of these cultures were imported from Asia by way of the islands of the Pacific Ocean. It is argued that, as the inhabitants of these islands seemed for the most part to be of the same racial stock as the Polynesians, they carried with them the elements of culture from Asia to all parts of the Pacific Ocean. These elements, it is asserted, derived originally from Egypt. Thus the Polynesians are said to have carried Egyptian cultural elements to the Americas. This is an extreme example of "diffusionist" theorizing.

We shall probably never know in detail how the cultures of the Mayas and Incas arose. But the main outlines of the history of these peoples now seem clear. Coming originally from Asiatic regions by way of the Bering Sea, the ancestors of the Mayas and Incas and of other aborigines no doubt carried with them a hunting culture. They knew how to make stone objects, including arrow points. Some of the tribes most favorably situated for agriculture developed a sedentary, soil-tilling culture independently of European or Asiatic agriculture. Plants and animals unknown in Europe or Asia were domesticated. Later, especially among the Incas, a metal culture came into existence, also independently of the other continents. The culture of the American aborigines, therefore, was based upon original and parallel inventions and was not due to the diffusion of African or Asiatic culture.

THE ESKIMOS AND THE NORSEMEN. The Eskimos occupied the northernmost parts of the North American continent and Greenland. Their culture was very different from that of the aborigines to the south. The Eskimos had adapted themselves to Arctic conditions with great success; they were hunters and fishers, lived in igloos, dressed in the skins of the seal and walrus, and made skillful use of animal tissues and

bones. These people were the first American aborigines to come into contact with the white men of Europe. Outlawed from Iceland, Eric the Red founded a colony of Norsemen on the west coast of Greenland in A.D. 1000. A second settlement was founded farther up the west coast. Greenland henceforth had more or less uninterrupted commercial contact with western Europe. The southern colony in Greenland was the western terminus of a trade route across Atlantic waters to Trondheim in Norway. There were a number of churches in Greenland, and at times there was a resident bishop at Gardar. The Norsemen exported walrus tusks and skins to Europe, purchasing in return objects they could not produce in Greenland.

The first white men to reach the North American continent were Norsemen. Shortly after the founding of the two colonies in Greenland a number of hardy voyagers repeatedly visited the east coast of the continent but made no permanent settlement. A Norse rune stone, discovered in 1889 on a farm in Minnesota, states that about the year 1364 a company of Norsemen spent some time in this region. Although often regarded as a fraud, in all probability it is a genuine rune stone, especially in view of the discovery in this region of other objects said to belong to Norsemen of that time. It seems entirely possible that Norsemen may have sailed west from their farms in Greenland across Davis Strait and Hudson Bay up Nelson River and traveled southward by land into what today is known as Minnesota.

The fate of the Norsemen in Greenland is a perplexing problem. The settlement farthest north came to an end during the fourteenth century. Dr. Vilhjalmur Stefansson believes that the Norsemen intermarried with the Eskimos and took over Eskimo culture because it was better adapted to conditions in Greenland. He believes that this theory explains why many Greenland Eskimos of the present day have remarkably European faces. The southern settlement continued to exist possibly until as late as 1500, that is, after the discovery of America by Columbus, a fact substantiated by archaeological studies made since 1921. Danish scholars have exhumed bodies from frozen graves and excavated sites of houses, barns, and churches. Shrouds found in the graves were mounted in the National Museum in Copenhagen. To the surprise of all, they revealed a succession of styles analogous to the changing styles of western Europe during the last three centuries of the Middle Ages! So far as effectual occupation of the North American continent is concerned, however, the Norsemen contributed little beyond preserving the tradition that there were lands far to the west.

Conquest of Mexico. Following the discovery of America in 1492, other navigators voyaged to the islands lying at the entrance of the Gulf of Mexico. Soon all of them were explored, and settlements were

made. The newcomers repeatedly heard rumors of the wealthy realm of the Aztecs in the heart of Mexico, far to the west, stories that whetted the covetousness of the Spaniards. Hernando Cortes (*d.* 1547), a landholder in Cuba, sailed from Santiago in Cuba and established himself on the Mexican coast at a place thenceforth known as Veracruz. With a force of 400 soldiers, twelve cannon, and thirty-two horses, he proceeded to Mexico, capital of the Aztecs. Tribe after tribe of subject peoples, chafing under the tyrannical exactions of their Aztec overlords, joined him; without their help, his project would have been futile. The roar of the cannon struck terror to the hearts of the Aztecs and the horses appeared to them as creatures from heaven. They regarded the Spaniards as a reappearance of their ancient war gods.

Finally, the small band reached Mexico, built on an island in a vast lake, lying in a blaze of sunlight like a fairy city. Though welcomed cordially, Cortes treacherously seized the ruler Montezuma and exacted a great quantity of gold. He was soon besieged in his quarters and, to avoid destruction, withdrew amid much fighting during the night of July 1, 1520. This was the famous "Sorrowful Night," the *Noche Triste* still celebrated in Mexico. He returned in December after receiving reinforcements from the rebellious enemies of the Aztecs and attacked the city, which fell in August, 1521. Soon all Mexico and Central America was in Spanish hands.

Conquest of Peru and Chile. Francisco Pizarro (*d.* 1541) resolved to duplicate Cortes' record by seizing the realm of the Incas in Peru, of which he had heard fabulous tales. He landed on the coast of Ecuador in 1532 and, following the example set by Cortes in Mexico, treacherously seized Atahualpa, the ruler of the Incas. After exacting a huge treasure of gold and silver—it filled a room 22 by 17 feet to a height of 9 feet—Pizarro slew him. He next moved upon sacred Cuzco, the capital, which he ruthlessly sacked. Here he obtained another fabulous hoard of gold. The empire of the Incas came to an end, and expeditions were next sent out to Chile. Santiago in Chile was founded in 1541, but it was a long time before the native tribes of that region were subdued. Lima in Peru, founded in 1535, became the chief Spanish center in South America.

Spanish Colonial Organization and Civilization. To manage their vast empire in America, the Spanish rulers set up a colonial government patterned after the institutions of the mother country. The *Casa de la Contratación*, or House of India, was created at Seville in 1503 to regulate economic relations with the new lands. Its officials acted under orders of the Council of India, a board appointed by the crown. In the colonies there were two viceroys, one in New Spain, or Mexico, and one in Peru. Besides these there were two captains general, one in Guatemala and another in Chile, with functions that supplemented those of the

viceroys. Twenty-eight provincial administrations were set up within 40 years after the conquest of Peru. Officials were assisted by a body known as the *audiencia*, a board possessing duties of an advisory, judicial, and administrative nature. So well did these institutions function that they continued in operation until the nineteenth century.

Particularly important were the towns in the Spanish New World. As many as two hundred were founded by 1560. Although managed somewhat democratically by a council of *regidores*, they gradually fell under the direction of royal representatives sent from Spain. These towns became centers of governmental administration, seats of bishops and archbishops, and places of commerce and business, the focal points whence radiated Spanish life, language, literature, and economic ways. There were spacious plazas, fine parks, broad streets, splendid churches built in the Spanish baroque style and decorated with baroque paintings, great cathedrals, Jesuit and Franciscan monasteries, and schools. Within thirty years after the conquest of Peru, these towns boasted over 160,000 Spaniards and many more Indians and negroes. Thus did the pioneers transplant to America the civilization of Spain.

Colonization of Brazil. Portugal did not colonize Brazil until after the middle of the sixteenth century. Precious metals were not discovered in any quantity; the chief sources of wealth were sugar and brazilwood. Nevertheless, by 1600 Brazil had a population of about 60,000, including whites, natives, and negroes.

Effects of the Discovery of the Americas. Significant as was the discovery of the Americas for Spain and for Europe, it was even more revolutionary for the aborigines. The advent of the Spaniard destroyed the promising civilizations of the Incas and the Aztecs. In spite of their progress, these native civilizations definitely lagged behind that of medieval Europe. This is evident when we compare the social life, political organization, economic progress, inventions, painting, sculpture, architecture, literature, theology, and philosophy of Europe with the culture of the Incas and Aztecs. Perhaps the world has preserved as much as it has lost by their ruthless destruction. This destruction, however, was not complete; a substantial contribution was made by the aborigines of Mexico, Peru, and other parts of the Americas. The modern cities Mexico, Quito, and Cuzco are built on the site of Aztec or Inca cities; trade routes developed by the Indians were used by the whites, and from the Indians the newcomers learned how to accommodate themselves to the new environment. Soon the flora and fauna of the Eastern Hemisphere were transferred to the Americas. Wheat, rye, oats, barley, figs, dates, olives, oranges, lemons, grapes, apples, plums, pears, peaches, quinces, currants, blackberries, raspberries, gooseberries, carrots, asparagus, melons, and other vegetables were

introduced. The Spaniards also brought with them the cow, pig, sheep, mule, horse, Spanish turkey, chicken, duck, goose, and the better breeds of goat.

From the beginning of the conquest, colonists made use of the labor of natives; the system of the *encomienda* became the foundation of Spanish American economic prosperity. Spaniards were granted the labor of the natives on the understanding that they were to look after their education and religious welfare and protect them, arrangements usually carried out in cooperation with native chiefs. Thus the country estate, or *hacienda*, and the parish church and monastery became familiar sights. The Indian as a rule was not exterminated by the Spaniards but became the social and economic substratum of a new civilization.

America's first great material contribution to the old world was the immense hoard of gold and silver that the industry of Aztecs and Incas had stored up. After these hoards had been appropriated, the Spaniards turned their attention to native mines, which began to produce handsomely with the help of Indian labor, later supplemented with negro labor. The Mexican mines of Tasco were worked about 1535, next those of Zacatecas, San Luis Potosi, and the fabulously rich Guanajuato. The silver mine of Potosi in Bolivia was opened in 1545, and the great quicksilver deposit at Huancavelica in Peru by 1564. Production of precious metals mounted steadily; the annual importation of gold and silver from America into Spain between 1503 and 1540 varied from about 143,400 to 558,800 pesos. From 1540 to 1550, it rose to 1,000,000 pesos annually and by 1600 mounted to the fantastic sum of 7,000,000.

As medieval Europe never had enjoyed a plentiful supply of precious metal, a quiet but effective revolution began. The closing Middle Ages, which had witnessed a steady rise in material prosperity, now received a mighty stimulus from the influx of gold and silver. It is a simple proposition that the more plentiful the supply of precious metals the cheaper they become; their value is determined by the food, clothing, and other goods they can buy. During the sixteenth century, there was a steady rise in the cost of living as more and more money was constantly required to secure the necessaries of life. Manufactured articles were sold in a rising market. The prosperity of the cities of Europe grew rapidly and even extended to the rural sections because farmers received higher prices for their products. This enabled the peasants to pay their debts with ease and helped serfs to substitute money payments for services but worked to the disadvantage of the landholding nobles because their incomes, being fixed by custom, could not be increased. Hence, the nobility, who had played so prominent a part in medieval history, declined in importance. Their places were taken by the new and prosperous business classes living in towns. The *bourgeoisie* became

leaders in government and society; they had the money that kings needed to pay officials and to support standing armies. The rapid increase in the supply of gold and silver helped to make the European monarchs of the sixteenth century strong and efficient rulers over a hitherto turbulent nobility. This brought about a vital transformation in European society, which, in turn, influenced every aspect of European culture. Even religion and ecclesiastical institutions were to pass through a crisis that was to some extent shaped by the revolutionizing effects of the voyages of discovery.

FOR FURTHER READING

ABBOTT, WILBUR: *The Expansion of Europe: A History of the Foundations of the Modern World*

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Chapter XXXIV

BREAKUP OF RELIGIOUS UNITY: PROTESTANTISM AND CATHOLIC REFORM

Medieval civilization was no flawless crystal.—J. N. Figgis

THE sixteenth century opened in the midst of changes that profoundly affected every phase of life. We have surveyed in Chap. XXXII the far-reaching revolutions in the attitude to life known as Humanism. The aversion of Humanists to asceticism—denial of the flesh and the spirit of otherworldliness—was encouraged by the geographical revolution caused by the daring of intrepid explorers. The flood of newly found gold and silver quickened the tempo of European life, stimulating the spirit of Humanism and all it implied. Secularism not only in economic and political but also in religious life became characteristic of the century. For twelve centuries the Christian faith had been accepted without question, the church had become most influential in looking after the religious needs of the people, and the priesthood had administered the sacraments, disciplined the faithful, and instilled a Christian philosophy of life. At the opening of the period known as the Reformation, which marks the breakup of medieval religious unity and which we are about to describe, no other institution in European life could compete with the church in range and profundity of influence.

Causes of the Reformation. Many causes contributed to the Reformation. One of the problems confronting the church was its temporal possessions. These included not only lands, tolls, market rights, and other characteristically medieval sources of income, but political rights, which constituted a kind of wealth. We have described how by the opening of the Middle Ages monasteries and parish and episcopal churches had been endowed with lands. This process had been voluntary; thus the pious gave concrete evidence of their affection for the church and the saints. Every generation witnessed new gifts; and as the church was perpetual, it became opulent. Many a monastery and parish church at the opening of the Reformation owned lands bestowed upon it early in the Middle Ages. Powerful princes sought to get control of these lands; they needed the support of nobility and *bourgeoisie*, and this could

most easily be paid for by appropriating ecclesiastical lands. Seizure of such property was an important and powerful motive in the countries that led in the Reformation.

The political rights exercised by abbots, bishops, and the Pope were a legacy of medieval feudal conditions. These rights had come into existence because of the political anarchy after the death of Charlemagne (*d.* 814)—during the ninth and tenth centuries. Churchmen took over political powers, acting as counts or dukes. They were vassals of feudal lords and in turn often were lords of vassals. Although such feudal political rights had nothing to do with the Christian faith or the church, they brought churchmen into political life.

Temporal possessions and the political relations that developed from them tended to corrupt churchmen. Abbots and bishops were exposed to the greed of princes. The latter made every effort to secure the appointment of friends and relatives to abbatial and episcopal posts. So successful was the king of England in controlling appointments that practically every abbot and bishop in the realm was named by him. In other words, abbots and bishops became royal officials. Further, parishes were in the hands of seigniors; the parish church together with its lands formed a part of the lord's manor. The lord nominated, or "presented," a candidate for the parish post, or "living," and the bishop usually appointed him without much hesitation.

Popular Criticism of the Clergy. The clergy sometimes proved unworthy of the calling to which they had dedicated themselves. According to the rules of the church a priest should be celibate, and the church had had good reasons to insist upon this rule. It was a simple matter to proclaim such a rule but quite another to enforce it. Some priests—the number cannot be determined with any accuracy—had wives. From the point of view of canon law, such priests were not legally married but were said to live in "concubinage." Notwithstanding the legal stigma of concubinage, many married priests undoubtedly led moral lives. Living in concubinage, however, they could not escape criticism, for the church formally demanded celibacy. Some of the most serious criticism came from the strongest, most concerned friends of the church. It was by no means always the enemies of the church who found most fault with clerical morals. But in estimating the validity of such criticism it is well to bear in mind that far the larger proportion of the clergy lived exemplary lives. The unworthy gained an exaggerated amount of attention, while the good and holy priest received little.

There was much criticism of the ignorance of the clergy. During the so-called "Dark Ages" the parish clergy for the most part were drawn from the peasant class. These priests rarely knew enough Latin to conduct the services of the church. There was some improvement

over the centuries, but the parish clergy never became a really educated group. Bishops as a rule were educated men even though they owed their appointment to princes. Monks and friars also were accused of being ignorant, in spite of the fact that the Benedictine order had played an astounding intellectual role during the first seven or eight centuries of the Middle Ages. We need recall only a few illustrious names such as those of Gregory the Great, the Venerable Bede, Alcuin, and Gerbert of Aurillac as proof. But not all Benedictine monks were highly educated. Some of them were not priests, and many were busy with the management of the social and economic affairs of monasteries. Benedictine, Cistercian, and Carthusian houses were primarily agricultural communities, and most of their inmates were recruited from the peasantry. The Dominican, Franciscan, and Augustinian friars in general were better educated because, living in the towns, they were in direct contact with the tendencies of their time. They had to be educated in order to take their part in the burgeoning intellectual life of the communities and to refute the arguments of the enemies of the church. As the later Brothers of the Common Life engaged in teaching, they were for the most part educated.

Assertions that the clergy were ignorant and incompetent must be studied carefully, for even the best educated of the clergy were criticized as being ignorant. Education and ideals of learning had undergone great changes since the fourteenth century. The Renaissance had introduced new conceptions, and Humanists believed that all upper class laymen should be educated. Such education was likely to be nonreligious and usually more or less in opposition to the education that clergymen received. Humanists who emphasized the reading of Latin and Greek classics, often for their pagan point of view, were usually opposed to the scholastic philosophy taught in the universities and preferred some form of Neoplatonism. They also read the Greek New Testament and the works of the Church Fathers such as St. Jerome in order to compare the church of their day, corrupted by its contact with political, social, and economic life, with the church founded by Christ and the apostles. They condemned the clergy as ignorant, no matter how well educated they were, simply because their education was of the old-fashioned and scholastic kind that they despised.

Humanists chided the clergy for their alleged moral shortcomings and exaggerated them. Stories dealing with clerical immorality were common. Boccaccio's *Decameron* and Poggio Bracciolini's obscene *Facetiae*, or *Jokes*, became popular. There was serious criticism of the strongly "otherworldly" attitude toward life. This point is usually misunderstood. Our medieval Christian forefathers usually were ascetic and reflected the discipline of the church. Men practiced self-denial

even in what we today regard as commonplace essentials. Asceticism in part sprang from the belief that life on earth was a preparation for a greater and more important life hereafter, that the evil of this world, its material interests, and shortsighted pleasures stood in the way of salvation. To deny this world meant to gain the next. An excessively ascetic attitude characterized the closing Middle Ages; harmless social, economic, and other human interests often were deprecated, and man's eternal end was exalted.

This ascetic spirit ran counter to the growing secularity, increasingly a feature of fourteenth-, fifteenth-, and sixteenth-century ideals, a conflict emphasized in a multitude of ways. Humanists became more numerous; their attitude influenced all parts of Europe. The economic revolution that followed the voyages of Vasco da Gama to India and the conquest of Mexico by Cortes and of Peru by Pizarro intensified the tempo of social and economic life. Princes were becoming powerful. As successful rulers of great states, they disposed of vast military and financial resources. All this clashed with the old ascetic ideals.

As always happens in cases of such widespread dissatisfaction, the personal equation became important. No matter how just or unjust the criticisms of Humanists may have been, men varied greatly in their attitude toward the problem. Large numbers remained faithful to the church while some broke with it. Among those who rebelled was a diversity of personalities such as the defiant Luther, the politically minded Zwingli, the zealous Calvin, and the humble, pacific Anabaptists. There was an even greater variety among the loyal supporters of the Catholic church. We need mention only the artist Michelangelo, the poet Vittoria Colonna, the saintly Sir Thomas More, the ascetic Ignatius de Loyola, the scholar and ecclesiastical statesman Thomas Cajetan, and the energetic and masterful Pope Paul IV.

Martin Luther. Martin Luther (1483–1546) was the first person during the Reformation to break completely with the church. His parents were of free peasant stock whose ancestors for generations had tilled the soil of Saxony. His father was a hard-working and severe man, but not poor as is often stated. Hans Luther, the father, moved to Mansfeld, where he found work in the flourishing copper industry and became a member of a firm of copper miners that owned at least six mines and two smelting houses. He rose from peasant's estate to that of a petty capitalist and town dweller. The future indeed looked rosy for Luther as his father determined that the son should be spared the hard struggle which had made his own life difficult. He accordingly sent the boy to the University of Erfurt as soon as he had finished his preparatory studies, in order to study civil law; he had observed that youths with a knowledge of this subject seemed sure of finding lucrative posts. The

father even attempted to look after the boy's social welfare and arranged that Luther should marry the daughter of a respectable and well-to-do burgher of Mansfeld.

After Luther had received the degree of master of arts in the spring of 1505, he suddenly turned his back upon these alluring prospects and became deeply interested in religion. One day, when returning to Erfurt from a visit to his father and mother in Mansfeld, he stood under a tree during a violent thunderstorm. Suddenly a bolt of lightning struck the tree and hurled him to the ground. Frightened he cried, "Help, St. Anna, I will become a monk." Believing that he was obliged to carry out this vow, he entered the Augustinian order on July 17.

At first Luther was happy in the monastery. He studied hard and became a priest and later a doctor of theology. He read the Bible with much thoroughness and during these years laid the foundation of his intimate acquaintance with that book. He committed whole chapters and even books to memory. His colleagues respected him and in 1510 sent him to Rome on the order's business. Later, he represented his house at a meeting of the order in Cologne. Soon thereafter he was named subprior of the house in Wittenberg.

But as his years in the order passed, he became severely depressed. This seems to have been a purely religious experience, for like most people of the time, he feared the day of judgment that every man had to face. Would he be saved? Like a good Catholic, he hoped that by believing that Christ was a divine sacrifice for the sins of man and by following the example of Christ and his purity he would surely be saved. But he had increasingly grave fears about the question that finally led him to utter despair. He had the idea that he could do nothing good in the sight of a God of matchless purity. The more he reflected over his inability to do good, the more despondent he became. He read in the Bible that Christ had commanded men to be as perfect as God himself. He believed that he was totally depraved in the sight of his Maker and feared that he would be forever lost. The theory of "total depravity" leads to the conclusion that man by his own efforts can do nothing meriting salvation in the sight of God. This doctrine advanced by Luther assumed revolutionary significance. The church taught that men are saved by their faith *and their good deeds*, which had always been an important part of medieval religious life. Often good deeds were imposed in the confessional as penances, and many people dedicated themselves to a life of good works—the Beguines and the Brothers of the Common Life, for example. But, according to Luther's reasoning, if a man was totally depraved in the sight of his Maker, good deeds were of no value in bringing salvation. What is especially significant, the doctrine of total depravity made the disciplinary work of the church obsolete.

Greatly distressed, Luther pondered how he might be saved. He came to believe that the answer was contained in St. Paul's Epistle to the Romans 1:17: "The just shall live by faith." By faith, then, one was saved, not by his good deeds. This is the origin of the epochal Protestant doctrine of "salvation by faith alone," a rebellion against the formal disciplinary power of the church. It became the rallying cry for all who were discontented with conditions in the church and marks the beginning of the breakup of the cultural leadership of the church in European society.

Luther became professor of theology in the University of Wittenberg, a school founded by the elector of Saxony. His lectures were given in concrete and vigorous German. Such use of the mother tongue was uncommon, for Latin had been the sole medium of university instruction. Luther lectured for several years on St. Paul's Epistles and was deeply influenced by the Neoplatonic thought of Eckhart and Tauler. Their mysticism tinged his religious thinking. He stressed man's inability to do anything worthy of meriting God's favor, emphasizing salvation by faith only. He urged reform of abuses in church and private life and had recourse to scathing denunciation.

Finally, in 1517, came the occasion that was to bring Luther into public notice. This was the controversy over indulgences. We have already described indulgences and so need point out only that the indulgence to which Luther objected was to secure funds for the laudable purpose of building St. Peter's Church in Rome. Luther objected to the preaching of the indulgences on the ground that the people who received them were not properly instructed as to their purpose. Some of his parishioners in Wittenberg revealed what appeared to him improper ideas about the efficacy of indulgences. He was greatly moved, for as we have noted above he had no patience with the idea that good works possessed saving value in the eyes of the Almighty.

Luther had never opposed the penitential practices of which indulgences formed a part. Now these practices seemed more closely related to the problem of salvation than had at first appeared to him. But he was not sure of his ground. He accordingly drew up a list of propositions in which the question of indulgences and their efficacy was stated (1517). These were the famous *Ninety-five Theses*. Luther nailed them to the door of a church in Wittenberg and invited men to discuss with him the points stated. In general, the theses minimized the value of indulgences and questioned the power of priests to forgive sins.

The *Ninety-five Theses* at first attracted no attention, because, written in Latin, they could not be read by the average layman. But when translated into German and printed, they became so popular that by the spring of 1518 they created a profound impression throughout Germany.

People who had real or fancied grievances against priests, monks, or the church read them with pleasure. Those who were familiar with the humanist literature were delighted. On the other hand, there were many who disapproved of the *Theses*. The hierarchy naturally was displeased, and many loyal Catholics refused to be influenced by them.

Luther, however, had stirred up a hornet's nest. Not only had he criticized indulgences, a practice general among Catholics, but he had called into question the power of the priests and even the Pope to forgive sins. This touched the foundations of the church although simple laymen at first did not notice this fact. Johann Eck, a professor of theology and an able controversialist, succeeded in inducing Luther to agree to a public disputation to be held in Leipzig in the summer of 1519. Eck found Luther a stubborn foe whose arguments, based on his own religious experience, proved difficult to refute. On the other hand, Luther was poorly versed in church history and exposed himself to the merciless logic of his opponent. Luther, as we noted above, had questioned the authority of the Pope, a crucial point in Catholic theology. This was Eck's opportunity. He argued there was but one church; it formed one body with one head, St. Peter, who had been named by Christ to be his viceregent on earth and whose successors in all ages since had held the power to bind and loose. The authority of the Pope therefore was infallible; he spoke for the community of Christians and stated authoritatively the content of Christian teaching. Luther would not admit this because he believed that man was saved by his faith alone, as taught in the Bible. It was obvious to Eck that Luther finally would be forced to assert that no authority was valid as against the opinion of any believer who read the Bible. For the moment, Luther took the position that a council representing the Christian community had authority to define religion. When Eck cited acts of councils that ran counter to Luther's position, Luther boldly advanced the statement that faith derived from the Bible possessed supreme authority. Beside such a personal faith the authority of popes or councils had no weight. This conception was revolutionary. If Luther's principles were adopted, the position of the church as the guide in religion and molder of civilization would be destroyed or at least profoundly modified.

The debate at Leipzig proved to Luther that there were many things in the past of the church about which he knew next to nothing. For example, he had asserted that papal headship was little more than four centuries old. Eck had had no difficulty in showing that this was incorrect. After the debate, Luther retired to Wittenberg and devoted a year to theology and church history. In 1520 he made a strong attack on the church in a pamphlet entitled *An Open Letter to the Christian Nobility of the German Nation Concerning the Reform of the Christian*

State. To grasp its argument the reader should recall that in medieval times there were supposed to be two authorities, spiritual and temporal. The former was superior to the latter, having been instituted by God, and possessed authority over faith and morals. But Luther had scant respect for this age-old conception. He had repeatedly asserted that a man was saved by his faith alone, as taught in the Bible. Now he developed his ideas with greater fullness. Every man, he asserted, was his own priest; there was no "spiritual estate" apart from the "temporal estate." Of course there were "priests," but these were set aside from the rest of the populace in order to administer the sacraments and give religious instruction. It was little more than a matter of division of labor. Just as all men wore shoes, yet a few shoemakers sufficed to supply the needs of a town, so the religious needs of men were cared for by a few priests. It is obvious that a priest from the Lutheran point of view was a very different sort of person from a priest from the point of view of the church.

The *Open Letter* contained Luther's theory of the relation between church and state. Throughout medieval times the two were separate although their membership was the same. Each was supposed to be supreme in its sphere. Priests were not men of the temporal estate. Luther objected to this because he held the view that all men were priests and belonged to the spiritual estate. He further held that a group of officials, or rulers, had been set aside by God from the rest of mankind to govern society, to manage the state which had been established by God. Luther based these ideas on St. Paul's Epistle to the Romans, 13. He argued that priests were subject to the secular power and demanded that the temporal body should proceed with the reform of abuses and evil practices which he asserted had so corrupted the church that they prevented the true exercise of religion. Rulers obviously had the right to call councils, and he cited the case of the Emperor Constantine, who had convoked the Nicene Council in 325. Luther's teaching destroyed the independence that the medieval church had enjoyed with reference to the state, and a state-controlled church resulted in the lands where Luther's opinions were adopted.

Following the *Open Letter*, Luther also attacked pious practices that had existed from time immemorial as, for example, pilgrimages, fasting, and saint's days. He pressed for the reform of a multitude of administrative abuses, which, he believed, should be considered in a council called by princes. Soon he issued another and even more revolutionary pamphlet, *The Babylonian Captivity of the Church*, in which he attacked the whole sacramental system of the church, especially the Mass. Luther asserted that there were but two valid sacraments, baptism and the Lord's Supper.

Thus Luther not only attempted to destroy the primacy of the Pope in the church and put an end to the power and position that the priesthood had enjoyed but also questioned the validity of five of the seven sacraments. Naturally, the Roman Curia took a serious view of these pamphlets and in December, 1520, issued the bull *Exsurge Domine* condemning Luther's teachings and ordering that no man should listen to them. In January of next year appeared the Pope's bull of excommunication, marking the complete rupture between Luther and the church.

Many took Luther's side in this controversy and regarded him as a national German champion against a "foreign" church conceived of as exploiting the German people. He had written his *Open Letter* in German so that the nobles and middle classes could read it, and as a result perhaps three-fifths of the German public sympathized with Luther. A diet of the princes, knights, and delegates of the cities of the German Empire met in Worms in the spring of 1521. Luther was asked to appear before it to retract the statements made in his pamphlets, which he flatly refused to do. The diet thereupon outlawed him. For the moment, Luther was protected by the safe-conduct of the emperor; so he left Worms but before reaching Wittenberg was seized by the soldiers of the elector of Saxony and hidden in the ancient Wartburg castle until the popular commotion subsided. While in hiding, Luther translated the New Testament into German.

The Peasants' War. In spite of the papal bull *Exsurge Domine*, it proved impossible to prevent people from reading and circulating Luther's pamphlets. Luther was the national hero, the German who spoke out boldly against the Roman Pope. His followers increased rapidly, and large sections of northern and central Germany became Lutheran. It was as much a German nationalist movement as it was a religious phenomenon.

Lutheranism continued to spread like wildfire until the Peasants' War. This uprising was due to unjust economic relationships between lords and peasants. The former were pressing for greater rents so that they could live in luxury and spend money freely. They did not know the actual value of money, as often happens among people who do not have to work for it. Further, prices were rising steadily, and the nobles lived on incomes that could not readily be increased. Those in southern Germany used every expedient to force greater rents from their peasants. They had been attempting to do this for several generations, and much ill feeling resulted. Finally, in 1525, the peasants raised the standard of revolt. Inexperienced and ignorant, but not very violent, they put forward demands for better terms.

Some of the peasants were influenced by Luther's teaching; the idea that all men are priests appealed to the average man, for it seemed to

exalt him above the hard conditions of life. On the whole, however, the peasants remained faithful to the Catholic church. Luther, who believed that rebellion was wicked because he thought it contrary to St. Paul's Epistle to the Romans, 13, urged the nobles to put down the uprising with every means at their disposal. They did so with characteristic severity, even with brutality. It was a sad episode: the peasants gained nothing, many were killed, and the lot of the rest became worse. They did not however forget the harsh words of Luther. They concluded that he was a false leader and in the bitterness of their defeat turned to the church of their fathers for solace. To this day, southern Germany has remained Catholic. The Peasants' War was the first check that the Lutheran movement received.

Ulrich Zwingli. Luther's ideas soon found adherents outside Germany. In Switzerland, they were embraced and championed by Ulrich Zwingli (1484–1531). His father was a free Swiss citizen, a local official much like an American sheriff. During his youth, Zwingli was a Humanist, believing that mankind could be improved morally mainly by education. He was a vigorous preacher, attacking abuses and protesting against the custom of young Swiss men taking service in the armies of foreign princes because of the moral risks involved. Zwingli finally became the very successful cathedral preacher in Zurich. Soon pestilence came to the city and carried off a large number of the citizenry, and Zwingli himself nearly died. This experience caused him to reflect; he adopted a more serious view toward life and became more religious. Although Luther's example had influenced him before, the new ideas now took on deeper meaning. Henceforth, he wrote and talked more like a Lutheran.

So great was Zwingli's influence in Zurich that in 1523 the canton of Zurich became Zwinglian. Other cantons followed its example although some remained loyal to the ancient Catholic faith. Consequently, there was trouble between the cantons which followed Zwingli's teaching and those which remained Catholic until, in 1531, a war broke out. Zwingli accompanied the army of Zurich as a chaplain and was slain.

The Reformation in Switzerland was to a considerable degree political. Each canton voted whether it would remain Catholic or become Zwinglian. Zwinglianism was more radical than Lutheranism. Zwingli caused bells, pictures, statuary, and organs to be removed from the churches and put an end to most of the pious practices dear to Catholics. Further, he was opposed to the mystical element in the Lord's Supper. Luther insisted that Christ was truly present in the bread the moment the believer as his own priest took it. Zwingli, on the other hand, argued that the Lord's Supper was simply a memorial of Christ's sacrifice.

Reformation in England. The Reformation in England is especially interesting because it well illustrates the part that rulers played in breaking away from the traditional church. King Henry VIII, who reigned from 1509 to 1547, having no male heir to succeed him decided to divorce his queen Catherine. But he could not induce the Pope to grant him a divorce, this being contrary to Catholic teaching. Rebuffed, he determined to break with Rome. In 1529, Parliament under his influence began to pass acts restricting various practices in the church. Thomas Cranmer was appointed archbishop of Canterbury by Henry. That prelate summoned the king before his court and, after the trial that followed, granted him a divorce (1533). The Pope declared this divorce invalid. In reply, Parliament in 1534 passed the Act of Supremacy, which stated that the king of England was supreme head of the church of England. Soon after this, began the confiscation of monastic lands. In matters of doctrine, however, the Anglican church retained the organization and for the moment the doctrines of the ancient church.

The Anabaptists. One of the most interesting groups of the Reformation period were the Anabaptists. Unlike Lutheranism, Zwinglianism, or Anglicanism, Anabaptism was a nonnational movement. Luther and Zwingli taught that a person was to be saved only by his faith, acquired from study of the Bible. Among the followers of these reformers were some who made a zealous study of texts and found, as they thought, that their leaders did not carry out the teachings of the Gospels and Epistles completely. For example, they insisted that only when people were old enough to comprehend the meaning of the step should they be baptized. They also declared that there should be no connection between church and state. Further, they argued that the state was wicked and that Christians should have no relations with it, its courts, or its armies. The Anabaptists were so called because they believed that children baptized in their earliest days should be rebaptized. For those who did not have their children baptized at all, the authorities of Zurich decreed and exacted the death penalty.

In spite of this harsh opposition, Anabaptism spread throughout central Europe and became especially strong in the Netherlands. Its history is a pathetic one. Every state was opposed to the movement, and its followers were vigorously persecuted. Many an Anabaptist suffered death by burning at the stake, drowning, or being buried alive; many were mutilated. They alone at this time maintained that the state might not inflict corporal punishment upon people who could not accept the dictates of the state in matters of religion.

John Calvin. John Calvin (1509–1564), the most influential Protestant reformer next to Luther, was a Frenchman, born in Noyon

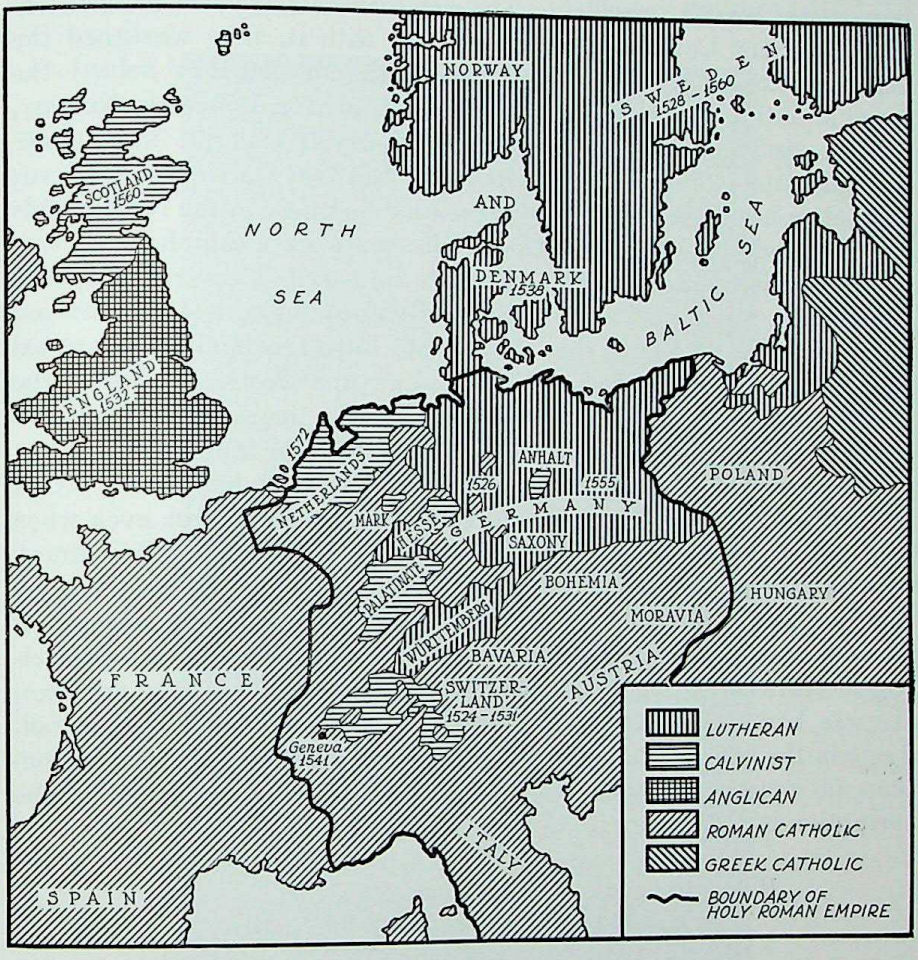
and educated in Paris, where he studied to become a lawyer. The clarity and precision that characterized Calvin's thought were partly due to this training. At first, Calvin's attitude toward religion was much like that of the Humanists; but in 1532 or 1533 a sudden change came over his thinking. He became profoundly religious, being especially influenced by Luther, and thenceforth ranged himself on the side of the small but growing group of French Protestants persecuted by the king. Finally, he fled to Geneva, where he became very influential and was able to reform the gay and carefree life of that city. Soon such neighboring places as Lausanne and Neuchâtel became Calvinist.

Calvinism is the name given to the theology and religious philosophy taught by John Calvin and his followers. Calvin was a lucid thinker and the master of a marvelously clear prose style. His great masterpiece is the *Institutes of Christian Religion*, first published in 1536 but repeatedly revised until 1559, when a definitive edition appeared. In this book, Protestants found arranged systematically all the data about the Christian religion. No other book produced in the Protestant camp could match it in thoroughness and completeness. The following are a few of its central points: God in his infinite perfection and kingly majesty has created the universe. The Bible is "God's Word"; it teaches the way to salvation. Everybody should read and study it, for every word is inspired. God has predestined some people to eternal glory and others to eternal damnation. All humanity suffers the consequences of the fall of Adam, and this original sin is passed on to every member of the human race. It so vitiates man's every thought and deed that he is totally depraved; he can do nothing worthy of salvation in the eyes of the Almighty. He can be saved only by faith given by God. Much of this seems fatalistic to us but actually it is not fatalism, for in the Gospels it is stated that God really wants all men to be saved and none to be lost. Our inability to see the justice of God's predestinating action arises from our own sinfulness, according to Calvin.

A stern morality characterized Calvin and his followers. They were strongly opposed to worldly amusements such as games, dancing, theater-going, the reading of romances, public festivals such as Maypole dances, and especially the pious practices of Catholics.

Calvin carried on an extensive correspondence with sympathizers in other lands, and in this way Calvinism spread into France, the Netherlands, Scotland, England, Germany, Poland, and Hungary. Calvinist churches were generally known as "Reformed," but in Scotland they were called "Presbyterian." In either case, they were governed by a consistory composed of ministers, elders, and deacons. In England the followers of Calvin were not in a position to establish a Reformed or Presbyterian church because of governmental opposition. All Englishmen belonged to the state church established by Henry VIII. Dissatis-

fied with the Catholic character of this Anglican church, followers of Calvin insisted that it be "purified" of its "popish" practices. They especially disliked bishops and wanted to remove them. For these reasons, they were called "Puritans."



MAP XXIX.—The Reformation, 1524–1572.

The attitude of Calvinists toward the relation of church and state was markedly different from that of the Lutherans. Like Luther, Calvin taught that the state was instituted by God and Christians were bound to obey it. Luther insisted that obedience was required in all things. Calvin, however, held that while the state had no authority in the matter of religion it must act in conformity with the Word of God. Should it make Christian worship impossible, Christians had the right to change the government by force. Some of the rebellions of the sixteenth century were justified by Calvinistic arguments, as, for example, the Dutch Revolt, which began in 1572.

SUMMARY OF THE PROTESTANT REVOLT. To recount the chief events of the Reformation, or Protestant Revolt, as it should more correctly be styled, would fill a large volume. Some of the fundamental ideas of Luther, the Anabaptists, and Calvin have been indicated. Their importance was far-reaching. The new churches became competitors of the ancient Catholic church; breaking with it, they weakened the Christian tradition in Europe. The Lutheran churches helped the cause of nationalism, for state churches appeared in Denmark, Norway, Sweden, and Germany. In some of the Swiss cantons, there arose Zwinglian state churches. In spite of the fact that Calvin did not favor state churches, Calvinistic state churches did appear in the Netherlands and Scotland. The Anglican church also was a state church.

The establishment of state churches more or less controlled by the government was a questionable step. By encouraging nationalism and national self-sufficiency the Protestant Revolt stimulated national cultures as against the international culture that had flourished in the Middle Ages. The Protestant Revolt therefore helped to put an end to the Middle Ages and marked the beginning of the modern age.

ADHERENTS TO CATHOLICISM. It would be a mistake to assume that all good and intelligent men broke with the Catholic church even when they criticized this or that aspect of religious life. From earliest times, zealous Christians had criticized the church and its members. During the Renaissance a number of the finest intellects were by no means slow to point to conditions that cried for reform. Such a person was Michelangelo (1475–1564), the poet, painter, sculptor, architect, and engineer. He was born before the Protestant reformers and outlived them all, dying in the year of Calvin's death. Michelangelo recorded his convictions in some of his sonnets. In the following he complained of the corruption in the papacy:

> Here helms and swords are made of chalices;
> The blood of Christ is sold so much the quart;
> His cross and thorns are spear and shields; and short
> Must be the time ere even His patience cease.
> Nay let him come no more to raise the fees
> Of this foul sacrilege beyond report!
> For Rome still plays and sells Him at the court,
> Where paths are closed to virtue's fair increase.
> Now were fit time for me to scrape a treasure!
> Seeing what work and gain are gone; while he
> Who wears the robe, is my Medusa still.
> God welcomes poverty perchance with pleasure:
> But of that better life what pope have we,
> When the blessed banner leads to nought but ill?

Michelangelo expressed his faith in the Catholic conception of life through his sculpture. So long was his life that he outlived his youthful friends, even the acquaintances of his middle life passed away, and this left him intensely lonely. He was further saddened by the woes brought to Italy by the wars between France and Spain. These feelings are

FIG. 89.—"Descent from the Cross," by Michelangelo. (*Courtesy of the Metropolitan Museum of Art.*)

reflected in his last work of art, the "Descent from the Cross." The group includes the tortured form of the Saviour tenderly held by Joseph of Arimathea assisted by the two Marys. This statue, preserved in the cathedral of Florence, was as eloquent an assertion of belief in the truth of the Christian view of life as was produced in this turbulent age.

Another expression of conviction in the Catholic faith came from Vittoria Colonna (*d.* 1547), a remarkable woman belonging to the Italian

nobility and one of the great feminine poets of Europe. Steeped in the humanist literature of the day, she remained true to her religious convictions. Her life was unfortunate, for her husband was faithless. She grieved over this and, when he died from wounds received in battle, was overwhelmed with sadness. Her exquisite sonnets are limited to this theme and to the comfort she found in religion. The following illustrates this point:

> From joy to joy, from one to other hand.
> Of such and gentle thoughts, supernal Love
> From the hard winter and the cold thereof
> Guides me to springtide's warm and verdant land.
> Haply the Lord—since He beholds me stand
> With breast like wax whereon the eternal seal
> Hath deeply cut a faith profound and real,
> Moulding my inmost heart beneath His hand—
> Wills not with bitter cross and steep ascent,
> But with the easy yoke and burden light,
> To lead me into port by some smooth road.
> Or it may be this little peace is lent
> By the wise goodness from my Father and God
> To arm and fit me for a weary fight.

It would be easy to add to these two examples of devotion to the ancient faith the names of many others, some of whom sealed their faith with martyrdom. A long list of devoted Catholics might be drawn up, but only a few of the more striking need be mentioned to illustrate the point. Among them were Thomas Cajetan (*d.* 1534), a great scholar and theologian; John Fisher and Sir Thomas More, martyred together (1535) because they refused to recognize King Henry VIII as head of the Church of England; Petrus Canisius (*d.* 1597), of the Jesuit order; San Juan de la Cruz (*d.* 1591), a Carmelite and mystic of highest character; and St. Theresa (*d.* 1582), one of the noblest women of the age.

Catholic Reform. By 1575 the Protestant Revolt had spent its force, and over half of Europe was still loyal to the ancient church. Ireland, France, Spain, Italy, Poland, parts of Switzerland and Germany, and half the Netherlands retained the traditional faith. In many of the larger towns like Antwerp and Cologne the burghers remained Catholic in spite of their princes. The hold that Catholicism enjoyed in many places was strengthened by a reform that swept over the Catholic church, beginning about 1520.

A number of reforming religious orders appeared during the age of the Reformation, chief among which were the Capuchins, Theatines, Ursulines, Barnabites, Oratorians, and Jesuits. Of these, the Jesuits were the most important. Founded by Ignatius de Loyola (1491–1556),

a Basque from Spain, the Jesuits became an effective agency in checking Protestantism and even won back ground lost to it. Originally, Loyola wanted to become a soldier, like all his family and friends. He was wounded while defending the walls of Pamplona and taken to a hospital. Racked with fever, he was saddened by the fact that his leg would be deformed for the rest of his life and, beginning to think about religion, completely changed his views of life. He determined to become a soldier of Christ. At first, he wanted to be a missionary and even went to Palestine to carry out this purpose. Later he placed himself and his followers at the disposal of the Pope. The new order was known as the Society of Jesus.

The basis of the Jesuit order was Loyola's *Spiritual Exercises*. This little book is a remarkable example of the religious literature of the time. It is closely related to the *Imitation of Christ*, written by Thomas à Kempis. Its central idea is to urge the reader to reflect upon the facts of the Christian faith, to purge himself of sin by prayer and meditation, and finally, if possible, to attain to a vision of God. Loyola was a marvelously effective drillmaster of the spirit. Following his *Spiritual Exercises* constitutes one of the best methods of instilling the religious attitude toward life.

The rule of the Jesuits contributed much to the success of the order. Its membership was limited, and the quality was high. Its novices spent 2 years preparing themselves for the three vows of poverty, celibacy, and obedience. After this step they were called "scholastics" and devoted themselves to the humanities, sciences, and theology. After about twelve years they became priests. A restricted number of the more able scholastics took a fourth vow, obedience to the Pope. At the head of the order stood a general, who was assisted by a congregation. The organizing as well as the religious genius of Ignatius de Loyola was clearly stamped upon the order.

The Jesuits were immensely successful. As a rule, they were able preachers, which enabled them to reach the masses, whose religious education had been neglected. The order also founded colleges wherever the government did not forbid Catholic worship. The curriculum of these schools was humanistic, being borrowed from those of the Italian Renaissance. A large number of well-educated and devout laymen issued from them to become staunch supporters of the Catholic church. The Jesuits also made notable contributions to science and learning. As confessors to lay princes, they were able to create favorable political conditions for their faith. Finally, the Jesuits were successful as missionaries. They carried the faith into the wilds of the newly discovered Americas and into the thickly populated countries of India, China, and Japan.

At first the papacy was slow to begin the work of reform, chiefly because large organizations usually move leisurely. But finally a council was called to consider the question of reform. This was the Council of Trent, which met at various times from 1545 to 1563. It passed many decrees defining the faith, condemned the teachings of the various Protestant groups, and provided rules for the discipline and education of the clergy. The Council of Trent marks the beginning of a new era in the history of the Catholic church.

A number of reforming popes appeared, beginning with Paul III, Pope from 1534 to 1549. Such pontiffs appointed worthy bishops, who in turn introduced vigorous discipline into the religious life of their dioceses, seconding the work of the bishops and theologians at the Council of Trent. Paul IV, Pope from 1555 to 1559, issued the *Index*, a list of books forbidden to Catholics, which contained the works of Protestant theologians as well as some of the more flagrantly immoral books of the Italian Renaissance. Its object was to guard the faith of Catholics. The Inquisition also become active under Paul IV, and so little clemency was shown to heretics in Italy that Protestantism rapidly disappeared from that country. Such energetic methods, reinforced by the zeal of the new orders and the widespread desire for reform throughout Catholic Christendom, enabled the church to assume an aggressive role. Some parts of Europe lost to Protestantism were recovered. Those remaining in the hands of Lutherans, Calvinists, and Anglicans were compensated for by gains in the Americas, where vast populations of the aborigines became at least nominal Catholics.

Significance of the Religious Crisis. The crisis in the religious life and thought of Europe was a serious matter in the history of Western civilization. During the Middle Ages, religion had inspired most of its characteristic activities—art, philosophy, literature, and poor relief. The rise of Protestantism broke the unity of the church, weakened its influence, and inevitably reduced its power to mold the life of the future. This crisis in religion therefore ushered in the modern age, in which religion for good or ill occupies a less conspicuous place in Western civilization and the state assumes the responsibility of education, charity, and relief.

FOR FURTHER READING

Betten, F. S.: *The Roman Index of Forbidden Books Briefly Explained*
Brown, G. K.: *Italy and the Reformation to* 1550
Clayton, Joseph: *The Protestant Reformation in Great Britain*
Constant, G. L.: *The Reformation in England: Henry* VIII, 1509–1547
Fanfani, Amintore: *Catholicism, Protestantism, and Capitalism*
Fife, R. H.: *Young Luther*
Grisar, Hartmann: *Martin Luther: His Life and Work*

HYMA, ALBERT: *Christianity, Capitalism, and Communism*
JACKSON, S. M.: *Huldreich Zwingli: The Reformer of German Switzerland*, 1484–1531
KIDD, B. J.: *The Counter-Reformation*, 1550–1600
LUCAS, H. S.: *The Renaissance and the Reformation*
MACKINNON, JAMES: *Calvin and the Reformation*
———: *Luther and the Reformation*
MARTI, O. A.: *Economic Causes of the Reformation in England*
PASCAL, R.: *The Social Basis of the German Reformation: Martin Luther and His Times*
PASTOR, LUDWIG: *The History of the Popes from the Close of the Middle Ages*
PAULUS, NIKOLAS: *Indulgences as a Social Factor in the Middle Ages*
POWICKE, F. M.: *The Reformation in England*
SMITH, PRESERVED: *The Age of the Reformation*
SMITHEN, F. J.: *Continental Protestantism and the English Reformation*
WALKER, WILLISTON: *John Calvin, The Organiser of Reformed Protestantism*, 1509–1564

Chapter XXXV

SCIENTIFIC REVOLUTION FROM 1500 TO THE DEATH OF NEWTON

History is just the whole life experience of our race, which we have to remember as long and as well and as closely as we can.—Ernst Troeltsch

ONE characteristic that differentiates the modern from preceding ages is the development of experimental science and the application of knowledge obtained through it to every department of life. In many respects the problems of modern civilization—economic, political, philosophic, artistic, and religious—are due to the rapid acceleration of scientific knowledge, derived from experimental methods, that seemed to clash with ancient ideas and institutions. Whatever we do or think is directly or indirectly conditioned by the forces so inaugurated. What the ultimate validity of modern scientific culture may be is, of course, hidden from us; but, whatever comparative value future historians may assign to it, we may be certain that it is of the greatest significance.

Scholars in 1500 made little practical distinction between philosophy and science. Philosophers were scientists, and scientists were philosophers. Science and philosophy were lumped together as "natural philosophy," which of course retarded the growth of the individual sciences. Moreover, the lack of scientific instruments and the inability of natural philosophers to grasp the importance of experimental methods still further retarded the growth of science—the study of nature in its general aspects, which results in the establishment of such autonomous sciences as botany, zoology, physics, chemistry, geology, and physiology. Philosophy, on the other hand, is the study of all things knowable and the discovery of general truths about them. The philosopher may study zoology—indeed he must study it—but he cannot limit himself to zoology, for that would prevent him from discovering truths that apply to all branches of knowledge. The philosopher therefore studies all things. Philosophers formulate general propositions; scientists gather masses of facts about classes of things, arrange them as well as they can, and so develop special sciences.

Such a distinction between philosophy and science had long ago been recognized; Thomas Aquinas had assumed it. But it is one thing to

assume a principle as true and quite another to act upon it. Scholastic philosophers were philosophers first and scientists—that is, experimentalists or investigators—only occasionally. One reason why scholastic philosophers preferred philosophy is the influence of Greek thinkers. The Greeks were subtly intellectual; but no matter how much they studied the details of nature and performed experiments, they remained philosophers, seeking to combine science with philosophy. Often they observed facts from some special point of view. This was fatal, for we must study, independently of preconceived ideas, how a thing works

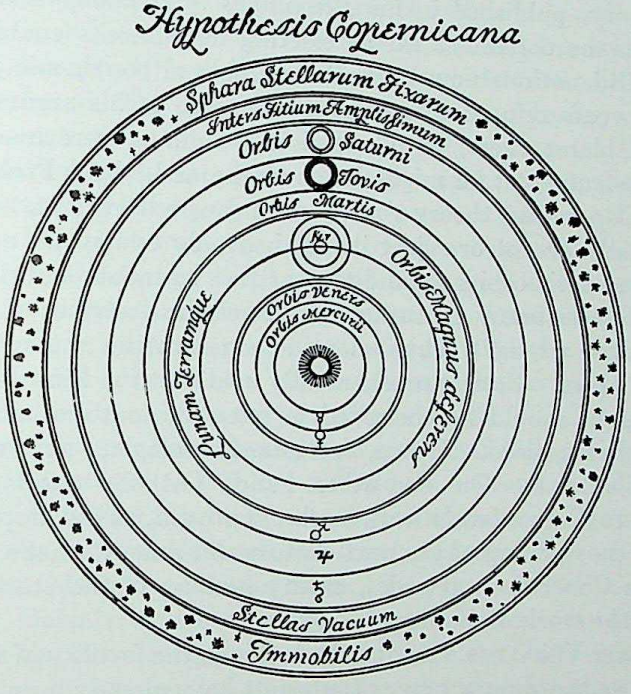


FIG. 90.—The Copernican system.

or how it is made. We must check and recheck observations to be certain they are as accurate as possible.

THE COPERNICAN SYSTEM. The sixteenth century witnessed important changes in scientific theory and knowledge. Nikolaus Copernicus (1473–1543), a Polish clergyman, revolutionized the ideas about celestial mechanics derived from Aristotle and Ptolemy and perpetuated by Arab and medieval scholars. He studied in Italian universities, particularly Padua and Ferrara, where his observations of the movements of the stars and sun made him skeptical of age-honored theories. With the aid only of instruments commonly used during the Middle Ages, such as the quadrant—it should be noted that telescopes had not yet been invented—and with his naked eye he came to the conclusion that some of the

difficulties inherent in the old theories could be solved if he assumed that the sun was stationary and that the earth, like the planets, revolved in circular homocentric orbits. In other words, he substituted a heliocentric for the Aristotelian and Ptolemaic geocentric universe. Thomas Aquinas and some other medieval scholars had been acquainted with the heliocentric theory first taught by Pythagoras but clung to the geocentric. Copernicus, however, believed that the movement of the sun and planets from east to west was only apparent, being due to the fact that the earth moved on its axis from west to east.

His theory, published in his *Revolutions of Heavenly Bodies* (1543), happened to be correct so far as existing instruments enabled him to observe. Old notions now began to crumble although many scholarly people for years refused to recognize the force of his arguments. We should not blame them, for Copernicus's findings were made without accurate instruments; he might be as wrong as he held Ptolemy to be. Since the Copernican theory was by no means self-evident, astronomers could honestly accept or reject it. If heavenly bodies did not move in circular concentric orbits around the earth as scientists and philosophers had taught these many centuries, would not the doctrines of astrologers also be proved wrong? Thus scientific conservatism was reinforced by theological ideas. Protestants generally held that the Bible, sole authority in religion, should be consulted in scientific matters because every word of it was inspired. Hence, Protestant theologians as a rule opposed Copernicus's ideas. On the other hand, Catholic theologians were indifferent to Copernicus's work or else approved, as did Pope Paul III. Only after the opening of the next century did some Catholic churchmen oppose the Copernican theories, chiefly because of the storm that was roused by the work of Galileo.

Anatomy: Vesalius. Leonardo da Vinci, the fertility of whose mind and whose extraordinary range of interests have already been referred to, made a profound study of anatomy. When preparing to execute the equestrian statue of Francesco Sforza, the tyrant of Milan, he made countless studies of the anatomy of horses, believing he could produce a perfect statue only if he knew exactly how a horse's body was constructed. With a similar interest in human anatomy, he made drawings illustrating muscular structure, the attachment of muscles to bones, the construction of the skeleton, and the character of the organs. In these studies, jotted down hurriedly in his *Notebooks*, Leonardo depended solely upon his own observations. Had he gone to medical schools he would have learned little more than what was then believed to be the nature of bodily structure.

Leonardo was not a medical man, however, and exerted little influence upon the study of anatomy. Andreas Vesalius (1514–1564), a Fleming

born in Brussels, was the first person to deliver a mortal blow at Galen's teachings regarding anatomy. At Louvain, Montpellier, and Paris, he had learned the time-honored doctrines, but they failed to satisfy him. He paid particular attention to bones, which he furtively collected from the places set aside in every city for the execution of criminals. He also dissected animals. Finally, he began to do an unheard of thing—dissect cadavers with his own hands. Hitherto, university professors clad in academic robes were wont to discuss anatomy from high desks while before them lay cadavers in the process of dissection by barber-surgeons. Assistants, also robed, pointed out the parts with a long rod. Students in academic garb listened to the lecturers and noted the actions of the assistants. Everybody kept his hands clean and learned nothing.

Vesalius found that traditional ideas about anatomy were wrong for they were at variance with what he himself observed. He went to Padua, where anatomical studies were highly appreciated, and such was his success that at twenty-three he was given a post in that famous university. His great work was the *Seven Books on the Structure of the Human Body*, published at Basel in 1543, the year Copernicus's revolutionary work on celestial mechanics appeared. Vesalius's book was a folio of 700 pages, with accurate illustrations. In it he corrected over two hundred errors that Galen had made and passed on to Arab and medieval scholarship. Some conservatives thought Vesalius was wrong; his former professor in Paris, firmly convinced that Galen had exhausted the subject of anatomy, called him a madman. Vesalius finally became court physician to the Emperor Charles V and when on a pilgrimage to the Holy Land was shipwrecked and died from exposure.

Practical Medicine: Paracelsus. In practical medicine, as well as anatomy, Galen's doctrines invited attack. No one was better fitted for this than the truculently independent Paracelsus (1493–1541). Born in Switzerland, he traveled far and wide, acquiring a vast mass of current knowledge about plants, minerals, medicines, diseases, magic, alchemy, and astrology. In this hodgepodge of lore, there was much quackery but some genuine knowledge. The book learning he acquired at the University of Ferrara failed to extinguish his love of nature, to which he resolved to look for guidance. Although he really understood little about nature from the modern standpoint, he knew more than the pedantic worshipers of authority in the universities. Compared with nature, respected names such as Hippocrates and Galen had no authority whatsoever to Paracelsus. His greatest contribution was the belief that medicines should be simplified; a few chemicals such as sulphur, lead, antimony, mercury, iron, copper, arsenic, and opium were sufficient. Paracelsus was the forerunner of pharmacists and physicians who relied upon chemistry. He quickly won great fame, as it was said he effected

cures where other physicians failed. In 1527 he accepted a post in the University of Basel as lecturer on medicine. He spared no one with whom he differed and vehemently attacked his opponents in coarse, vigorous German instead of the customary Latin. Finally, his enemies proved too much for him, and he was forced to quit his post, to die poor and neglected.

Paré. Surgery still remained under the tyranny of Galen's theories, but another iconoclast broke the charm of authority in this branch of medicine. Ambroise Paré (1510–1590), a Frenchman, began his medical career as a barber's apprentice. Had he gone to a university, he would have been required to accept unquestioned the doctrines of Galen and his Arab and medieval followers; instead, he was able to use his common sense. He had scant respect for tradition and, like Vesalius and Paracelsus, brushed it aside, ruining forever the sway of Galen and Hippocrates. Hippocrates had taught, for example, that cautery—the use of white-hot iron to sear wounds in order to disinfect them—should be employed whenever possible. "Fire cures diseases which cannot be cured by the knife and drugs," he said. Paré showed that in amputations it was better to bind up severed arteries than to sear them with glowing irons.

Paré's resourcefulness is shown by his discovery that gunshot wounds were not poisonous burns, as was believed. It was customary for army surgeons to pour scalding oil into bullet wounds, in accordance with Galen's teaching that "like must be treated with like." Paré at first followed this practice. But when on one occasion his supply of oil gave out, he resorted to dressings composed of the yolk of eggs, turpentine, and attar of roses. He was surprised that men so treated did not, like others, suffer from shock and fever. Paré wrote about these experiences in his classic *Journeys to Diverse Places* (1545). Later, he based his anatomical knowledge upon the great work of Vesalius.

Other Medical Pioneers. There were other significant medical pioneers, but we shall mention only Fracastoro (1483–1553), Fallopio (1523–1562), and Servetus (1509–1553). The first two contributed to the renown of the University of Padua. Fracastoro was interested in infectious diseases, which were a curse to Europe during the closing Middle Ages, when the population in the western and southern parts of the Continent was far greater than it had ever been even under the Roman Empire. Fracastoro studied leprosy, bubonic plague (Black Death), scabies, anthrax, erysipelas, tuberculosis, and syphilis. The results of his observations were presented in his book *On Contagions* (1546). He demonstrated that such diseases were transmitted by "seeds." Without the aid of a microscope, which was not yet invented, he anticipated the modern theory that these diseases were transmitted by germs. Fallopio,

an eminent anatomist, carried the theories of Fracastoro nearer to completion. He studied the anatomy of minute organs such as the semicircular canals of the ear, sinuses, ovaries, placenta, and sympathetic nervous system. Servetus, a stormy character, antagonized his colleagues in the field of theology and died at the stake in Geneva for his unusual ideas on the Trinity. But in medicine his name is illustrious, for he discovered that blood in its route from the right side of the heart to the left passes through the lungs. This is known as the "pulmonary" circulation. Servetus, however, failed to trace the entire circulation of the blood. Clinging to some of Galen's errors, he believed that the blood was a "vital fluid" until it passed from the aorta into the left ventricle, where the heart then transformed the vital fluid into blood.

Astronomy: Tycho Brahe. Times were changing; men were beginning to make observations and experiments without consulting the "authorities." Tycho Brahe (1546–1601), the first important astronomer after Copernicus, was a Dane who studied in the University of Copenhagen and became interested in planetary movements. Relying upon the naked eye and the old-fashioned quadrant, Tycho Brahe held firmly to the geocentric theory but made important original observations. A very bright star that appeared in 1572 remained visible for 16 months and aroused deep interest. So near the earth did it move that its path lay through the crystalline rings believed to surround the earth. How could the star penetrate the rings? Tycho Brahe never solved the problem, but, and this is most important, he made accurate mathematical observations. With the help of the king of Denmark, he built the first observatory of modern times at Uraniborg, a name meaning "castle of the heavens." He collected books and instruments and had a huge wooden quadrant equipped with a brass scale. Such a laboratory, provided with the best and most accurate apparatus, enabled him to make more exact computations. Sooner or later these new data were to check on old theories and prove their falsity.

Kepler. Johannes Kepler (1571–1630), a German who inherited Tycho Brahe's collection of mathematical data on the stars, perceived that the theory of circular and homocentric orbits was wrong. It did not agree with the facts that Tycho Brahe and he himself had so laboriously collected. He thought that possibly the orbits of planets were elliptical, and prolonged observations and calculations convinced him that such was the case. Kepler announced this astounding discovery in his famous laws, three in number. The first two are formulated as follows:

1. Planets move about the sun in elliptical orbits, the sun being at one of the foci.

2. The areas swept out by a straight line joining the centers of the sun and a planet are equal in equal periods of time.

According to these laws, illustrated in Fig. 91, the earth successively occupies at various times the positions *A*, *B*, *C*, *D*, and *E* as it moves in its elliptical orbit around the sun at *S*. The distances *AB*, *BC*, *CD*, and so forth, are equal in time. The areas of *ASB*, *BSC*, *CSD*, and so forth, are likewise equal.

Kepler believed—it was little more than a feeling—that there existed some mathematical relationship between the distances of planets and the average rate with which they speed around the sun. But to evolve a mathematical formula that would express this relationship was difficult, and he worked on it for years. He finally made a brilliant guess, which

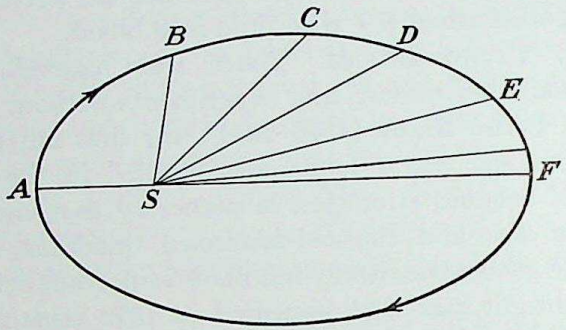


FIG. 91.—Illustration of Kepler's two laws of planetary motion.

happened to be correct, and, after much checking of data, he was able to enumerate his third law:

3. For all planets, the square of the time of a complete revolution is proportional to the cube of the mean distance from the sun.

Kepler's three laws not only destroyed what remained of the old Ptolemaic ideas but even modified Copernicus's conceptions.

GALILEO GALILEI. The next noteworthy scientist was Galileo Galilei (1564–1642), born in Pisa. His father educated him to become a musician, but the boy was interested only in mathematics and mechanics. One day, when in the cathedral of Pisa, he noticed that the great chandelier upon being lifted swung back and forth in ever smaller arcs but that the time required was the same each time it swung. He measured the vibrations by counting his pulse. This simple experiment had the elements of scientific greatness—observation of a single phenomenon accompanied by accurate measurement.

Galileo will ever be noted for his strenuous opposition to the idea that an investigator should obtain his facts from ancient authorities rather than discover them directly from the things studied. He dealt the most destructive blows against the authority of Aristotle; thenceforth, the scientific position of that thinker was limited to its true value. Galileo was bold, vigorous, dramatic, but quarrelsome. His most

famous experiment concerned the question of the rate at which bodies fall. Aristotle had taught that bodies fall at a rate proportional to their weight. A shot weighing 10 pounds, for example, would fall to earth faster than a shot weighing 1 pound. Galileo believed this was erroneous and proceeded to demonstrate his view, which, it should be stated, was based upon some previous experimentation. Before the assembled professors, students, and other curious people, Galileo climbed to the top of the Leaning Tower in Pisa and from a height of 180 feet dropped simultaneously two shot, weighing 1 and 10 pounds respectively. They reached the ground at the same moment. This demonstrated that mass has nothing to do with the rate of fall. For any falling body, the velocity increases 32.16 feet per second per second, no matter what its mass, air resistance being disregarded.

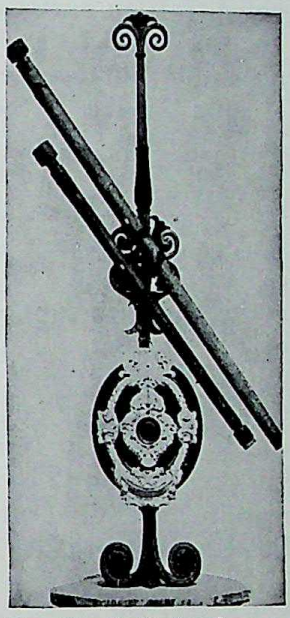


FIG. 92.—Galileo's telescope.

It is difficult for us today to realize the revolutionary nature of this dramatic experiment. The crowd that watched Galileo was still convinced that Aristotle was right even though the experiment showed him to be wrong. Few accepted Galileo's teaching even when proved before their very eyes. Only one of his colleagues at the University of Pisa agreed with him; the others consulted Aristotle and continued to believe Galileo was wrong. Some of them even resented the experiment and became so bitter that his stay at Pisa became impossible. He resigned his professorship but soon secured a better post at the University of Padua.

Continuing his observations and experimentation, Galileo repeatedly showed that Aristotle's ideas were erroneous. When a new star appeared in 1604 and aroused much discussion, he boldly rejected the teaching of Aristotle and Ptolemy about the heavens in favor of the theory taught by Copernicus. He also became deeply interested in magnetism, a subject that had been investigated by William Gilbert (1540–1603) of Colchester in England, who had collected all that was known about the magnetic properties of iron in his book *On the Magnet*. Galileo speculated that the earth was like a magnet and its rotation caused by magnetism, but he made no notable contributions to Gilbert's work.

While at Padua, Galileo perfected the telescope. Lenses had been studied for a long time; Roger Bacon, who lived in the thirteenth century, had been interested in them. Eyeglasses were common in the fifteenth

century. But not until Galileo's day did anyone think of using lenses to magnify distant objects. A spectaclemaker in the Netherlands, named Hans Lippershey, produced a telescope in 1608, and from its description Galileo made an improved model. It consisted of a lead tube with a convex lens at one end and a concave lens at the other. After making several instruments, Galileo produced one that magnified objects as much as four hundred times. For Galileo, this was a thrilling moment because no mortal had ever seen what he was about to observe. He noted that the surface of the moon was not smooth as though polished, but rough and covered with mountains, valleys, and plains. He was amazed to find that the Milky Way was composed of an infinite number of stars invisible to the naked eye. The constellation of the Pleiades had forty stars instead of seven, that of Orion eighty instead of seven. Turning his telescope toward Jupiter, he observed the moons circling around it in elliptical orbits. He noted that Saturn was not a simple star, as had formerly been taught, but that two smaller stars appeared at each side of it. He studied them closely for a long period of time, noting that their position changed steadily until they finally disappeared, only to reappear after a lapse of 3 years. But Galileo never understood the nature of Saturn's rings and its satellites, a discovery reserved for Christian Huygens in 1656. Galileo also studied the phases of Venus and tried to study Mars and Mercury, whose relative nearness to the sun caused them to be so abundantly lighted that his telescopes never revealed anything about these planets beyond the bright light from them. He also discovered sun spots.

Every student has read of Galileo's trial before the Inquisition, which grew out of misunderstanding and intolerance. Philosophers and scientists had for the most part been hostile to Copernicus's theories. They resented Galileo's questioning of Aristotle's ideas on science and showed hostility when he disproved them by laboratory methods. They sought help from the theologians, many of whom also were intolerant. It would have been well for them had they kept in mind Thomas Aquinas's ideas about the formal difference between science and theology. But very few, whether theologians, philosophers, or scientists, observed the distinction between the two subjects.

Catholic theologians, as a rule, were friendly toward the theories of Copernicus. They regarded the church founded by Christ as the true guide in faith and morals but were usually tolerant of scientific theories. While the Bible was divinely inspired and could not teach an untruth, Catholic theologians were not forced to test all things, including the hypotheses and theories of science, by biblical texts. Clement VII, Pope from 1523 to 1534, was favorably interested in Copernicus, who later dedicated his revolutionary book to Paul III, Pope from 1534 to

1549. When Galileo went to Rome in 1611, he was cordially received by Cardinal Barberini, later Urban VIII, Pope from 1623 to 1644. The reigning Pope Paul V and many of the cardinals were interested in Galileo's discoveries, and a committee of four, appointed by Paul V, approved his scientific ideas, revolutionary as they were. One of the chief officials in the papal court prophesied that Galileo's doctrines would in time be universally accepted.

Many, nevertheless, were profoundly disturbed by them. Dragged into a religious discussion, Galileo rashly ventured into biblical scholarship and was finally accused before the Inquisition. Regarding itself as the watchdog of true religion, that tribunal zealously opposed any teaching which might start another religious dissension like that of Luther, Zwingli, or Calvin. Galileo heard of the intrigues against him and determined to go to Rome in person, thinking to silence objections by arguing for his discoveries and demonstrating them scientifically. But on Feb. 19, 1616, the tribunal decided that the heliocentric theory was "false and absurd philosophically, contrary to the Bible, and erroneous theologically." The Inquisitors in this decision, it should be noted, improperly passed on points pertaining to science and philosophy as well as theology. On Feb. 26, Galileo was "commanded and enjoined, in the name of his Holiness the Pope and the whole Congregation of the Holy Office, to relinquish altogether the said opinion, that the sun is the center of the world, and immovable, and that the earth moves; nor henceforth hold, teach, or defend it in any way whatsoever, verbally or in writing." In the future, Galileo was permitted only to "discuss" the heliocentric theory.

Returning to Florence, Galileo continued his researches and, in 1632, published his *Dialogue on the Two Systems of the World* with the approval of the ecclesiastical censor. Three characters take part in the discussion—Salviati, Sagredo, and Simplicio, the Italian for "simpleton." Salviati argues for the heliocentric theory, Sagredo listens attentively and asks humble questions, while Simplicio in silly fashion seeks to defend the theories of Aristotle and Ptolemy. In this way, Galileo believed he was discussing the question and advocating nothing. Written in Italian, the book promised to become popular, but the character of Simplicio offended many. It was thought that he stood for a type, the conservative scientist, philosopher, and theologian. Enemies of the new doctrines convinced Urban VIII that Galileo meant him; the Pope was displeased, and Galileo was cited to Rome.

Again Galileo was accused of having advocated the heliocentric theory in his new book. An old man, nearly seventy, sick, and weary of opposition, he listened on June 22, 1633, to the sentence that forbade his book to be sold, condemned him to ecclesiastical prison, and ordered him

to recite the seven penitential psalms each week. Kneeling before the tribunal and with hands touching the Bible, Galileo forswore his teachings and promised never again verbally or in writing to advocate them. Such was the outcome of this miscarriage of justice. The condemnation of Galileo was not in accord with the best traditions of the church in its relations with science. It was not an official pronouncement of the church; this would have required the papal assent, which was not given, or a decree by a council. It was nevertheless unfortunate, for the Inquisition and a number of the theologians had mistakenly used theology to oppose scientific doctrines based solely upon experiment.[1]

Galileo's ever-fertile brain continued to be active. He wrote the *Dialogues on the Two New Sciences*, printed in 1638 in Amsterdam, where no ecclesiastical authorization was needed. He continued to believe in the Copernican theories as they had been modified by Kepler. His death occurred in 1642, the year that marked the birth of Newton, the English scientist and philosopher who carried on and completed the work of the great Italian. When Newton died in 1727, Aristotelianism in experimental science was practically defunct.

New Scientific Instruments. The technical skill of the age produced a number of instruments that furthered the revolution in science. As we have seen, the telescope, first invented in the Netherlands, was perfected by Galileo. The microscope also appeared at this time. It seems to have been produced first in the Netherlands by Zacharias Jansen (1590); but it underwent constant improvement so that, like the telescope, it helped bring on the great scientific revolution. Torricelli (1608–1647) (see also page 606), the famous pupil of Galileo, perfected the barometer—an instrument composed of a tube of glass containing mercury designed to measure the pressure of air. At about this time also appeared the hygrometer, to measure the amount of moisture contained in the air. Christian Huygens (1629–1695) (see also pages 605 and 606) studied the mathematics of the pendulum and the cycloid and invented the pendulum clock in 1657, producing a more accurate timepiece than had ever existed. Micrometers also appeared at this time, to complete the list of basic instruments necessary for the minute investigation of nature. Although the theory of the thermometer was known and various devices for measuring heat existed, this instru-

[1] To prevent misunderstanding of the trial, it should be borne in mind that Galileo never was tortured by the Inquisition. His incipient blindness was due to advancing age, not to the alleged torture. The Inquisitors treated him courteously and even humanely, considering the standards of the age. Nor was Galileo put into the prison of the Inquisition. He was assigned various residences in Rome, Siena, and Florence, where he lived under certain restrictions. Finally, the story that upon rising from his knees after abjuring his "heresy" he said, "It moves nevertheless," is pure myth.

ment was not perfected until about 1725 by Gabriel Fahrenheit (1686–1736).

Scientific Societies and Journals. Learned scientific societies came into existence. For some time, it had been customary for men to form associations or academies for their mutual encouragement, the Platonic Academy of Florence formed in the fifteenth century under the auspices of Cosmo de' Medici serving as a model. The Academy of the *Lincei*, or "Lynxes," at Rome (1603) was so called because its members were credited with being able to penetrate the secrets of nature as readily as lynxes were supposed to see through stone walls. The Florentine Academy of *Crusca* was so named because its members were able to sift the flour from the *crusca*, or bran, meaning the separation of truth from error. The Royal Society of London was chartered in 1662, and four years later the French *Académie des Sciences* began its sessions. A large number of other societies came into existence, and prominent scientists were elected to membership. They corresponded with each other, and their scientific letters and papers were printed in the publications of the academies.

Scientific journals also sprang into existence. It was in the *Sidereus Nuntius* that Galileo read about Lippershey's telescope. The *Acta Eruditorum* published in Leipzig reviewed new scientific books. The important *Journal des Savants*, which began publication in Paris in 1665, is still a valuable scientific journal. By means of these journals and the publications of academies, students could acquaint themselves with new scientific discoveries. This was the beginning of a vast body of scientific literature that has become a veritable mine of information.

Calendar Reform. During this time an important reform was effected in the calendar. The reckoning of time was a problem that interested men even in Neolithic days. The Egyptians invented the solar year based upon the apparent course of the sun around the earth; reckoning the time by the sun became a habit among the Mediterranean peoples. However, errors in computing the sun's cycle produced discrepancies so that Julius Caesar in 46 B.C. corrected the Roman calendar. Upon the recommendation of astronomers, he decided that the year should contain 365¼ days and that each fourth year was to be counted as a leap year, a day being added to February, the shortest month. Thus the Julian calendar came into existence and continued in use throughout the Middle Ages.

As time went on the Julian calendar was found to rest upon an erroneous calculation, until, by the sixteenth century, it was 10 days behind the astronomical year. Finally, Gregory XIII in 1582 adjusted the calendar by skipping 10 days; Mar. 11 was to be followed by Mar. 21. In the future, every fourth year was to be counted as a leap year except

those ending in two zeros and divisible by 400. Thus 1600, 2000, and 2400 are not leap years, but the years ending in two zeros that come between them are. This arrangement practically solved the matter. The discrepancy still unaccounted for in the Gregorian calendar amounts to about 1 day in 35 centuries, a difference that for all practical purposes may be regarded as unimportant. The Gregorian calendar was at once adopted in all Catholic lands. In other countries, princes were reluctant to follow the papal example. Today, however, the Gregorian calendar is in general use.

HARVEY. Medical science and practice made great forward strides during the seventeenth century. Vesalius and Paré had shaken the authority of Galen, but much remained to be done. An Englishman named William Harvey (1578–1657) who studied at the University of Padua solved the problem of the circulation of the blood. An excellent anatomist, he also studied physiology. After more than nine years of experimentation, he showed how the blood is distributed by the left side of the heart to all parts of the body. The blood returns through the veins to the right side of the heart, then to the lungs, where it is purified through contact with oxygen. Next, it is carried to the left side of the heart, pumped through the aorta, and distributed through the network of arteries. These discoveries were announced in his *Anatomical Exercises on the Motion of the Heart and the Blood in Animals*, which appeared at Frankfort in 1628. Harvey failed, however, to explain how the blood passes from the arteries into the veins.

The prenatal history of animals, including human beings, remained a profound mystery although every generation had been interested in the subject. Lack of a microscope prevented Harvey from going very far in charting the life of the embryo. Nevertheless, the phrase *omne vivum ex ovo*, "every living thing springs from an egg," coined by him was destined to become influential.

OTHER SEVENTEENTH-CENTURY SCIENTISTS. The telescope had revolutionized astronomy; the microscope was to perform a similar service in revealing the existence of a vast world of microorganisms. Jan Swammerdam (1637–1680) of Amsterdam was an industrious microscopist who discovered the red corpuscles in the blood and the valves of lymphatic veins. An Englishman named Robert Hooke (1635–1703) observed that living things are formed of vast aggregates of cells. Anton van Leeuwenhoek (1632–1723) of Delft studied microscopes and made improved models. Turning his attention to minute things, he described spermatozoa and protozoa, revealed the striated aspect of voluntary muscles, studied the crystalline lens of the eye, and discovered bacteria. By an ingenious experiment, he disproved the old doctrine of abiogenesis, or spontaneous generation, and showed that living beings spring from

other living beings either directly or from eggs laid by them, and not from sand, mud, or decaying matter as was commonly believed.

Marcello Malpighi (1628–1694), an Italian professor of anatomy, was the founder of the science of histology, the study of the structure of tissues. He made many discoveries in connection with organs the study of which had always been neglected. He investigated the kidney, spleen, papillae of the tongue, pulmonary tissues, nerves, and the embryo. He also discovered the minute capillaries through which the blood passes from the arteries into the veins, thus completing the epochal work of William Harvey. These discoveries marked the beginning of the vast study of microorganisms today called bacteriology. Though its progress was slower than the science of astronomy, in the course of time it proved as revolutionary. Bacteriology ultimately became the foundation on which modern sanitary engineering rests.

Bacon. Sir Francis Bacon (1561–1626), a philosopher who came under the spell of the new scientific ideas toward the end of the sixteenth century, is a good example of the sixteenth- and seventeenth-century attitude of skepticism toward the old scholarship. As a student at Cambridge he learned that the commonly accepted philosophical and scientific ideas were unreliable and was much impressed with William Gilbert's experiments with magnets. He believed that men should conduct experiments, make accurate observations, keep full records of them, and formulate carefully thought-out ideas. In this way, general ideas or laws about the universe might be enunciated. This method of study is known as "induction"; principles were to be stated only from the study of particular facts.

Bacon's inductive method, however, was faulty, inadequate. A scholar must indeed study nature in all its details, but he must also use his imagination. Many scientific achievements are the result of bold imagination combined with the ability to observe. Brilliant guesses, or hypotheses, must repeatedly be tested in the light of facts, especially such as are newly discovered. If guesses do not fit facts, they must be modified or discarded. Finally, after much study, a scientist may formulate a hypothesis so that it may be called a theory. A theory is only approximately accurate; it may be modified by subsequent study. A good example is the Copernican theory of the universe, which, changed by Kepler, has been profoundly modified in our own times. What was correct has been retained; its errors have been eliminated, in part at least. But Bacon, not being an active scientist, little understood the magnitude of the task facing scientists. Nevertheless, his books proved influential: his *Advancement of Learning* criticized the old scholarship, and his *Novum Organum* explained how scientific study should be carried on.

DESCARTES. René Descartes (1596–1650) was a Frenchman who spent much of his life in the Netherlands, where he published his works, the most important being the *Discourse on Method* (1637). Like Francis Bacon, he was deeply impressed by the scientific and other changes of the time, which no thoughtful person could avoid noticing. Descartes was adept in mathematics and eagerly followed the progress of scientific discovery. He felt that much of the scientific teaching of the scholastic philosophers of his day drawn from the works of Aristotle, Ptolemy, and Galen was incorrect. Even scholastic philosophy seemed to him full of errors, although it is certain that Descartes did not thoroughly understand it.

Descartes believed that he could be absolutely certain of only one thing, namely, that he himself was a thinking being. He assumed that he could employ doubt as a universal principle and make this one exception. For this reason, he produced his motto *Cogito ergo sum*, "I think, hence I exist." This fact to him was the rock on which all knowledge seemed to rest.

Thinking beings were aware of a world external to themselves, the universe of *matter*, which stood face to face with *mind*. This idea was the beginning of the problem of "mind and matter." Descartes thought of the world as composed of a boundless mass of small particles of matter. He thought of these particles mathematically or, rather, geometrically; for, he said, they possessed extension, that is, length, width, and thickness. They were ever in motion and crowded each other, thus producing gigantic eddies, which he called "vortexes." The sun with its system of planets formed one vortex. The entire universe was composed of vortexes, each one limiting its neighbors. This fanciful theory was long ago abandoned. Its chief service was to destroy whatever was left of the lingering belief in the Ptolemaic system of crystalline spheres. The reader should note at this point that Descartes' theory of vortexes was the forerunner of a hypothesis later formulated by Laplace known as the "nebular hypothesis," still held today although with modifications.

How mind and matter act upon each other was difficult to explain. The body Descartes held to be a mechanical thing. Composed of matter, it acts mechanically like a clock. The mind, or soul, resides in the pineal gland situated between the two halves of the brain. The soul transmits its impulses to the body, directing its movements much as an engineer directs his establishment. Descartes taught that God had created both mind and matter and had given each its peculiar qualities. As man's idea of God was that of a perfect being, an idea that did not come through his experience, obviously it was placed in the mind by God himself. In other words, the idea of God is "innate," being

implanted from the beginning. It holds together the entire structure of man's world.

The problem of the mind has always perplexed men. Without mind, how can matter act? Without matter, how can mind subsist? And given the existence of mind and matter, how are they related? Descartes believed that the universe was a vast mechanical whole kept in motion by qualities given to it by the Creator. It is plain that his ideas owed much to the discoveries of scientists like Kepler, Galileo, and Harvey.

Spinoza. Baruch Spinoza (1632–1677) was an excellent mathematician. He reasoned much like Descartes but argued that mind and matter are substances very similar, differing merely in some of their attributes. The peculiarity of mind is that it produces thought; the peculiarity of matter is extension. It follows that spirit and matter are the same, that God and his creation are identical. This is a point of view we call "pantheistic." Spinoza, a Netherlandish Jew, suffered for his unorthodox ideas and was expelled from the synagogue. He earned a precarious livelihood in The Hague, grinding lenses, but later retired to the neighborhood of Leiden, where he lived and philosophized in obscurity.

Leibnitz. One of the most remarkable of the learned men of the time was Gottfried von Leibnitz (1646–1716), a German born in Leipzig. He was a man of universal learning of the kind common in ancient Alexandria and in Renaissance Italy. Like Descartes, he believed that the universe was composed of atoms, which he called "monads." These monads, he argued, had been created to act in perfect harmony. They varied a great deal, however, in quality. Each monad "represented" the universe, but some monads more perfectly than others. In fact, there was a scale of perfection extending from the soul downward. Preestablished harmony was created by God. Mind and body were composed of monads; hence, the two acted in harmony, like two clocks running independently of each other but keeping the same time.

Newton. The greatest of the scientists of the seventeenth and eighteenth centuries and perhaps of modern times was Sir Isaac Newton, an Englishman, born in Lincolnshire in 1642. His death in 1727 marked the close of the first great formative period of modern science. His chief work was to formulate the so-called "Newtonian laws of gravitation." Newton read the works of Galileo, who had revealed by means of the telescope a vast and majestic system of planets revolving in elliptical orbits around the sun. Several questions arose in his mind. What kept the planets and the moon in their course? Why did they not rush off in a straight line into endless space? What was the nature of the force which drew objects to the earth? Was this force the same as

gravity? Galileo and others after him held that the earth by a force they called gravity drew the moon to it and the sun attracted the planets, so that instead of rushing off in a straight line into space they were restrained by a force strong enough to cause them to take an elliptical course.

It is one thing to state such ideas, but quite another to prove them. Newton measured the attraction that the earth exerted on the moon in the following manner: The moon traveling along its orbit and arriving at point *A* would proceed in a straight line if the earth at this moment should suddenly cease attracting it. In that case, the moon at the end of 1 minute would proceed to *B*. But the earth continues to pull the moon to itself so that it persists in following its orbit with the result that in 1 minute it arrives at *C* instead of *B*. The distance from *B* to *C* is approximately 15 feet; therefore, Newton said, attracted by the earth the moon falls 15 feet in 1 minute.

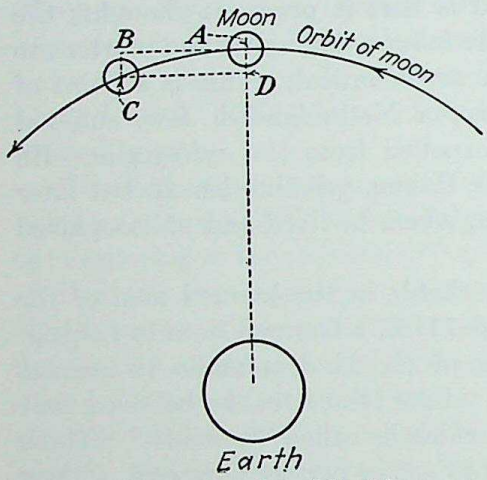


FIG. 93.—Illustration of the fall of the moon.

Was this "falling" due to gravitation? That question was also considered by Newton. On the earth's surface, bodies fell at the rate of 16.08 feet the first second and at an increased rate of 32.16 feet each second thereafter. On the moon, bodies fell much more slowly, owing to the distance of the moon from the earth. Newton found that the distance *AD* which the moon fell in 1 minute corresponded mathematically with the rate of falling on the surface of the earth. This mathematical relationship was tested many times, and when Newton in 1687 proved it was constant, he formulated his famous laws. The most remarkable single discovery yet made about the heavens, these laws showed that one formula governed the movements of the moon and the planets. It made obsolete all the speculations of Egyptian and Babylonian astronomers. The notions of Aristotle and Ptolemy, which governed thinking on such matters throughout the ages down to the days of Galileo, Kepler, and Newton, collapsed. The following are Newton's laws:

1. Every body continues in its state of rest or of uniform motion in a straight line, except in so far as it may be compelled by force applied to it to change that state.

2. Change of motion is proportional to the applied force and takes place in the direction in which the force acts.

3. To every action there is always an equal and contrary reaction, or the mutual actions of any two bodies are always equal and oppositely directed.

Newton's first work on becoming professor of mathematics at Cambridge when twenty-seven years of age concerned the problem of light, or optics. While experimenting with light, he became interested in the way colors appeared in a telescope, a phenomenon called "chromatic aberration." He thought that some peculiar relationship existed between rays of light and the glass through which they pass. A ray of ordinary light *A* is admitted through a hole in an opaque substance *BC*. It falls upon a prism of glass *DEF*. Passing through it, the ray breaks into several parts as it falls upon the wall opposite and forms the spectrum. Newton discovered that the index of refraction varies with each color, the angle being less in the case of violet and increasingly larger with each

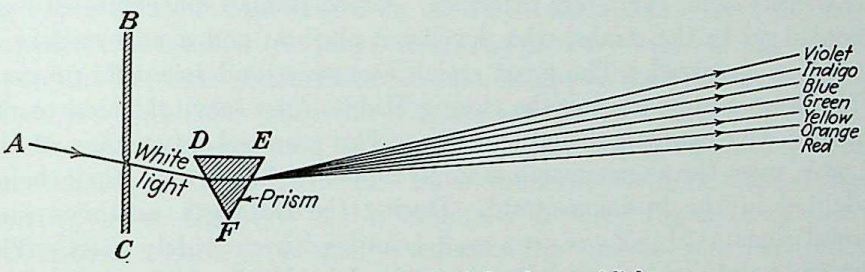


FIG. 94.—Illustration of the theory of light.

successive color. He reversed the process by permitting the spectrum to pass through a second prism, and a clear ray of ordinary light resulted. Therefore, white light was not a simple thing but a compound of colored rays. These discoveries put the study of optics on a firm foundation. Later it led, as we shall see, to the development of spectrum analysis, of vast importance in scientific work.

Newton made practical use of his discoveries by producing an improved telescope in which chromatic aberration was eliminated. This he did by causing the light from an object studied to pass through a lens and fall upon a concave mirror. The resulting image was clear and free from aberration. This device is called a reflecting telescope. Newton made one with his own hands that is still shown in the Royal Society in London.

HUYGENS. Christian Huygens (1629–1695), a Netherlander and early contemporary of Newton, conducted researches in connection with light that were of the greatest importance. Light, he declared, is caused by the vibrations of a substance that fills all space. This substance he called "ether," a term still used among scientists. Newton, on the other hand, held that light is formed of currents of exceedingly small particles

of matter sent out from a lighted source at high velocity. Sight, according to Huygens, is caused by the vibrations of ether striking the eye; according to Newton, it is due to the particles striking it. Newton's view was generally accepted at the time, although Huygen's theory has since supplanted it.

Progress in Mathematics and Physics. The remarkable scientific growth of the sixteenth and seventeenth centuries necessitated an ever-increasing knowledge of mathematics, for mechanical and scientific problems cannot be stated without mathematics. As absolute accuracy is the ideal of such work, scientists of the seventeenth century labored to develop mathematics. Men had learned to count in prehistoric times. Some counted by tens, others by twelves. Arithmetic evolved; and gradually elementary propositions of a more complex character appeared, especially in Babylonia. Finally, in Greece, geometry, plane as well as solid, came into existence. Greco-Roman mathematics were handed on to the Arabs, who developed algebra, and a new system of notation appeared. The great social, economic, and scientific progress of western Europe during the closing Middle Ages inevitably led to the further development of mathematics. The practical advantage of the Arabic over the cumbersome Roman numerals had led to their being adopted in the business world. During the sixteenth century, such useful signs as $+$, $\times$, $-$, $\div$, $=$, ( ), and $\surd$ were widely used. The decimal point was invented, it appears, by John Napier (1550–1617); and Simon Stevens, a Netherlander, developed the use of decimal fractions.

These practical improvements, however, could not help much in the rapidly developing knowledge of astronomy and related sciences. Descartes invented analytical geometry, which enabled scientists to treat mathematically many complicated phenomena of nature. Newton discovered the binomial theorem and developed a branch of mathematics that he called "fluxions," similar to calculus. Leibnitz also developed this subject; and there has been much debate whether he or Newton should have the honor of the discovery. Huygens contributed to the development of mathematics, for he solved the mathematical problems of the pendulum and evolved the theory of evolutes, especially the properties of the cycloid.

A problem that interested seventeenth-century scientists was the nature of air. Torricelli (1608–1647), a pupil of Galileo, was the inventor of the barometer; his experiments led him to formulate the principle that a column of water is forced to such a height that its weight exactly balances the pressure of the atmosphere. In an exhausted tube, Torricelli found that this height was always 33 feet. He determined to see how mercury would act under similar circumstances. Being thirteen times as heavy as water, it would not require a glass tube over 3 feet

long, he reasoned. Filling the tube completely with mercury, he placed his thumb over the open end, while putting this end in a bowl of mercury. The column of mercury descended until it stopped about thirty inches above the mercury in the bowl. By this simple experiment, Torricelli showed that the height to which a liquid rises in an exhausted tube depends upon its weight and that its weight exactly balances the pressure of the atmosphere.

Torricelli's experiment did not satisfy all students, for his simple explanation ran counter to an ancient principle of science, namely, that "nature abhors a vacuum." Scientists were loath to abandon this theory. But Blaise Pascal (1623–1662), a noted French thinker, gave the death blow to all objections. He reasoned that if Torricelli's experiments were correct the rise of mercury in a barometer would be less on top of a high mountain because the pressure of air would also be less. The experiment was performed on the Puy-de-Dôme in central France. Two identical tubes, 4 feet long, containing mercury were carried up the slope. At the base of the mountain, the height of the mercury in each tube was noted. One tube was left in a convent in Clermont-Ferrand. The mercury in it measured 26 inches. The mercury in the second tube was found to be only 23 inches when the experimenters reached the summit. After the party had descended a distance, the mercury stood at 25 inches. These experiments confirmed the correctness of Torricelli's original proposition.

Otto von Guericke (1602–1686), Burgomaster of Magdeburg, experimented with methods of producing a vacuum. He tried to produce one by pumping water out of a barrel but found that the barrel filled with air. Next he enclosed a barrel within a larger one, which he filled with water. When he pumped the water out of the smaller barrel, it, too, filled with air. Then he tried to pump air out of a globe made of metal. Its walls were so thin that the pressure of the air caused the globe to collapse with a loud report. Finally, Von Guericke produced a successful air pump. A heavy glass globe was joined to a pump mounted on a strong iron stand and operated by a long lever. Each time the lever was forced down, some air was drawn out of the vessel and a stopcock was turned, eliminating the possibility of air returning into the globe when the lever raised the piston preparatory for the next stroke.

Robert Boyle (see below) was deeply interested in physics and chemistry. Reading about Von Guericke's experiments, he determined to produce an improved air pump. One feature of his new model was the barometer that he attached to it. As the air was drawn from the glass globe, the column of mercury fell. This was an ideal illustration of the principle discovered by Torricelli and further confirmed by Pascal.

Beginnings of Chemistry. Robert Boyle (1627–1691), an Englishman, was one of the most active founders of the Royal Society of London. His greatest service to science consisted in his revolt against alchemy. In 1661, he published *The Sceptical Chemist*, in which he attacked the alchemist's teachings about "elements." He defined an element as something that has not been decomposed. This idea that there are some elements which cannot be broken down was to prove valuable in developing chemistry. Boyle was the first to use the phrase "chemical analysis." In 1662, he announced his famous law of the compressibility of gases, still referred to as "Boyle's law," namely: At a constant temperature the volume of a given mass of gas varies inversely as the pressure sustained by it.

Although Boyle pointed the way toward a new chemical science, Georg Stahl (1660–1734), a German, was the first to produce a comprehensive theory—the phlogiston theory—about the composition of matter. "Phlogiston" is a "fire substance" that escapes when matter, whether wood, paper, iron, sulphur, or acids, is decomposed. This is a most faulty theory from the standpoint of present-day chemistry. But to belittle the achievements of our forefathers who laid the first sound foundations of chemistry would be equivalent to deriding all the achievements of science and of civilization. The phlogiston theory explained, in the light of the science of the time, most of the then known facts about chemistry. It is to their great credit that Boyle and Stahl overthrew the tyranny of alchemy.

Surveying in retrospect the progress of science in early modern times, we note a marvelous revolution in thought. First we see the rise of experimentation under laboratory conditions. Only dimly had thinkers realized the immense results to be secured from investigation carried on in a systematic manner. Next, we note the invention of devices indispensable in scientific investigation. From the point of view of invention alone the appearance of the telescope, microscope, thermometer, barometer, pendulum, and micrometer would have made this period noteworthy. But when we consider the degree to which these instruments promoted the systematic investigation of nature we marvel at the greatness of the sixteenth and seventeenth centuries. Never in the history of civilization had there appeared a galaxy of names so significant in the development of science. The achievements of Copernicus, Brahe, Kepler, Galileo, Harvey, Swammerdam, van Leeuwenhoek, Huygens, Malpighi, and Newton outshine those of any similar group of former times. The far-reaching significance of their labors becomes apparent when we realize that the new scientific knowledge gained through their endeavors was but the beginning of a movement which was to transform the material conditions of modern life. Before dis-

cussing these changes, however, it is necessary to sketch other aspects of culture. In the next two chapters, we shall outline some notable aspects of the Baroque Age, from the death of Michelangelo in 1564 to that of Louis XIV in 1715.

FOR FURTHER READING

BREARLEY, H. C.: *Time Telling through the Ages*
BROWN (ed.), E. W.: *The Development of Science*
BROWN, HARCOURT: *Scientific Organization in Seventeenth Century France* 1620–1680
BUCK, A. H.: *The Growth of Medicine*
CASTIGLIONI, ARTURO: *A History of Medicine*
CONWAY, B. L.: *The Condemnation of Galileo*
DAMPIER-WHETHAM, W. C. D.: *A History of Science and Its Relation with Philosophy*
FAHIE, J. J.: *Galileo, His Life and Work*
GINZBURG, BENJAMIN: *The Adventure of Science*
HART, I. B.: *Makers of Science: Mathematics, Physics, Astronomy*
———: *The Great Physicists*
———: *The Mechanical Investigations of Leonardo da Vinci*
HEMMETER, J. C.: *Master Minds in Medicine*
KARPINSKI, L. C.: *The History of Arithmetic*
LENARD, PHILIPP: *Great Men of Science*
MOORE, I. J.: *A History of Chemistry* (rev. ed.)
ORNSTEIN, MARTHA: *The Role of the Scientific Societies in the Seventeenth Century*
PARÉ, AMBROISE: *Journeys in Divers Places*, in Harvard Historical Classics, Vol. XXXVIII
ROBINSON, VICTOR: *The Story of Medicine*
SIGERIST, H. E.: *The Great Doctors*
SINGER, CHARLES: *The Discovery of the Circulation of the Blood*
SMITH, D. E.: *History of Mathematics*, Vol. I
STIMSON, DOROTHY: *The Gradual Acceptance of the Copernican Theory of the Universe*
USHER, R. P.: *A History of Mechanical Inventions*
WOLF, ABRAHAM: *A History of Science, Technology, and Philosophy in the Sixteenth and Seventeenth Centuries*

Chapter XXXVI

THE AGE OF ABSOLUTISM: SIXTEENTH AND SEVENTEENTH CENTURIES

It is well sometimes to do with a map of Europe at critical periods what a painter does with his canvas, stand away from it and view it with half-closed eyes so as to behold only the salient features.—J. H. Rose

THE Baroque Age followed the Reformation, from the death of Michelangelo in 1564 to the passing of Louis XIV of France in 1715. In this chapter we shall consider some of the more important features of the period outside France.

Like the words Romanesque, Gothic, and rococo, "baroque" is a term derived from the language of art and, applied to a particular age, signifies the culture of that period. In decorative art, it stands for the use of broken curves. Whether in painting or sculpture, it signifies garments that float and do not fall naturally under their own weight; garlands and festoons of fruit and flowers used in profusion; columns with twisted or spiral patterns that take the place of the simple plane or fluted surfaces employed in former times; and statues that seem to gesticulate and to vibrate with energy. Emotionalism becomes the leading feature. Buildings of the Baroque Age are heavy, grave, and impressive, their effect rendered more striking by the plentiful employment of voluptuous sculpture.

Baroque art in general was sumptuous, magnificent, and impressive. It is the art of the ancient Catholic church, which emerged from the Reformation triumphant but by no means restored to its ancient position of unquestioned leadership in the religious and cultural life of Europe. Still teaching her ancient truths, she sought to impress people with a splendid art. "A good picture makes better religious propaganda than a sermon," said Federigo Zuccaro, first president of the Academy of St. Luke, a company of painters organized in Rome under Gregory XIII, Pope from 1572 to 1585.

Italy in the Baroque Age. Italy long played a leading part in civilization. In religion, government, economics, science, painting, sculpture, architecture, and mechanical invention, no other European country was so influential during medieval and modern times until about 1700. But this leadership came to an end during the Baroque Age. One reason for this was the economic decline due to the loss of overland

trade with the Orient and the Near East after the voyage of Vasco da Gama by way of the Cape of Good Hope to Calicut. A second reason is the fact that Italy never became a united nation. There was no central government for Italians as there was in Spain for Spaniards and in England for Englishmen, with the result that Italy became the prey of foreign powers. The economic decline and the numerous wars of the sixteenth and seventeenth centuries ruined Italian well-being. Nevertheless, Italy remained the most important cultural center of Europe, from which new ideas and ways of doing things spread to other lands.

Italian Baroque Sculpture and Architecture. Rome became a city of magnificent buildings, splendid palaces, and noble churches that are still her glory. The church of the Vatican was greatly changed, its approaches ornamented with mighty colonnades. On the façade of the church appeared sculptured saints appearing to sway in the breeze, triumphantly proclaiming to faithful and heretic alike that the church founded by Christ still taught the ancient truths. New streets and squares provided with sculptured fountains were laid out. These splendors were not short-lived; even today, they impart to Rome the qualities that make her the noblest city in Christendom.

The Art of Bernini. Giovanni Bernini (1598–1680), the chief inspirer of the baroque style at Rome, was a sculptor as well as an architect. To heighten the effect of his work, he employed stucco, richly colored marbles, and gold leaf. His figures express emotion so keen that one might call them dramatic. A good example is the statue of Apollo and Daphne, which illustrates the Greek myth of Daphne pursued by Apollo and turned into a tree. Bernini's "Ecstasy of St. Theresa" shows the great feminine saint of the sixteenth century in vision wafted aloft, her body in a swoon, and her clothes falling in loose folds. "The Fountain of the Four Rivers" in the Piazza Navona with its colossal figures is typical of the art that now began to adorn the public squares of Rome and other Italian cities. Bernini's architectural skill is best studied in the façade of the Barberini Palace in Rome and the colossal colonnade in the piazza in front of the Vatican.

Baroque Painting. Baroque painting originated in Bologna. A Fleming named Denis Calvaert (1540–1619) who painted in Bologna became the originator of the Baroque school. Like most artists of northern Europe, he had come to admire and study the work of the great masters of the Florentine, Umbrian, Mantuan, and Venetian schools. He then combined what appeared to him their more laudable characteristics. This idea was carried forward by a group of his pupils, a painter named Lodovico Carracci (1555–1619) and his nephews Agostino (1557–1602) and Annibale Carracci (1560–1609). They have been

called "mannerists" because their pictures tend to be theatrical and pompous, with extraordinary effects of foreshortening, balanced composition, ecstatic expression, and exaggerated motion and with a multitude of flying angels. Lodovico Carracci's "Madonna with Saints" is typical of the style of the Bolognese artists. It shows the Virgin with the child Jesus upon her lap, St. Francis and St. Dominic in attitudes of adoration, and Mary Magdalene offering a jar of ointment. The holy group is attended by a crowd of flitting angels.

The Bolognese school exerted a profound influence, particularly in Italy, where painting for a long time remained an exaggerated synthesis of the great schools of the High Renaissance. Guido Reni (1575–1642) of Rome continued the manner of this school. His famous "Head of Christ" is a perfect example of the expression of poignant grief characteristic of the new art. His "Aurora," on the other hand, is more in harmony with the synthetic tendencies of the Carracci. Another painter who was to exercise a profound influence outside Italy, especially in the Netherlands, was Caravaggio (1569–1609). "The Entombment" is typical of his work. Profound and frantic sorrow is written in the faces of the holy men and women who accompany the corpse to the tomb. Another peculiarity of Caravaggio shown in this picture is that backgrounds are painted like the deep shadows of night, thus emphasizing the reality of a sad drama. In this picture is to be noted a use of light and shadow (chiaroscuro) that Rembrandt was to employ with great advantage. Further, Caravaggio preferred to depict people from the humble walks of life, not the grand personages so prominent in the art of the Carracci and their followers. This feature pleased Netherlandish artists of the seventeenth century and stimulated their genre painting, a style that dealt realistically with familiar and simple scenes of everyday life.

Italian Literature. Italian literature continued to be widely read by the educated of Europe. Petrarch, Machiavelli, Castiglione, Ariosto, Tasso, and lesser lights were greatly admired. Italian themes, thought, and literary style were copied everywhere; Shakespeare, for example, used Italian settings in his *Merchant of Venice*, *Othello*, and *Romeo and Juliet*. Portia, one of his best creations, is a typical, educated woman of the late Renaissance—free, alert, bold, and intellectually the equal of educated men. But, as in art, the style of the Italian writers of this period is pompous and overly ornate, one of the besetting literary sins of the time. We find this manner characterizing all European literature of the Baroque Age. Thus, Shakespeare in his *Romeo and Juliet* gives Romeo the following to say when he arrives at the scene of the street brawl between the Capulets and Montagues:

O me! What fray was here?
Yet tell me not, for I have heard it all.
Here's much to do with hate, but more with love:
Why then, O brawling love! O loving hate!
O any thing! of nothing first create!
O heavy lightness! serious vanity!
Mis-shapen chaos of well-seeming forms!
Feather of lead, bright smoke, cold fire, sick health!
Still-waking sleep, that is not what it is!
This love feel I, that feel no love in this!

Though a common expression of the age, each country had its own term for this ornate style. England called it "euphuism" from John Lyly's *Euphues;* Spain, "gongorism" from the poet Gongora (1561–1627); France, *préciosité;* and Italy, "marinism" from the poet Marini (1569–1625).

Italian Music. Italian music, too, became famous and influential although, curiously, it received its original impetus from the north. Musicians from the Low Countries had introduced to Italy new methods, especially counterpoint, which became ingenious and complicated. One of the Netherlanders, Orlandus di Lasso (*d.* 1594), represented the highest development of this sort of music, but he avoided the excessively clever tricks of his predecessors. His compositions include a variety of secular works such as madrigals, drinking songs, and love songs, as well as religious compositions. In Italy, Giovanni da Palestrina (*d.* 1594) evolved a new style employing old devices but emphasizing simplicity. The *Mass of Pope Marcellus* is the greatest of his compositions.

Italian Theater and Opera. The Italian theater was especially interesting. The popular comedy, or *commedia dell' arte,* reached its height about 1600. Strolling companies produced the plays. Actors were masked, whence this comedy is called the "masked comedy." The stock characters wore traditional costumes like the stage Dutchmen and Irishmen of our vaudeville fifty years ago. They were types characteristic of Italian society, such as the swaggering soldier of fortune, the doctor, and the frivolous young woman. Characters like Harlequin and Pantalone were also popular. Only the simplest plots were followed, the actors improvising their dialogue as they saw fit. Their allusions and repartee, usually scurrilous, dealt with local conditions and persons. Shakespeare's *Hamlet* contains a play within a play that gives a fair idea of what a strolling company was like and how it produced an entertainment. The actors played up to each other, and had ready tongues and minds well stored with classical allusions, which were greatly appreciated. Free expression of opinion was not allowed in Italy, but

actors of the *commedia dell' arte* often were able to say the things that no one else dared utter, which explains their immense popularity and significance in the life of that day.

Serious drama had little chance of competing with the popular strolling companies. Tragedies and comedies closely followed classical models, especially Seneca, and exerted much influence upon the drama of Spain and of France in the age of Louis XIV. Opera became the typical musical form of the Baroque Age. Palestrina's musical compositions, more natural and simple than the music of his predecessors, were well suited to dramatic recitation, especially solo, and easily adapted to opera. The first play to be sung, or opera as it came to be called, was the *Dafne* presented in Florence in 1594. Other operas followed in rapid succession as, for example, the *Euridice* played in the Pitti Palace in 1600 on the occasion of the marriage of Henry IV of France to Marie de Medici.

Opera was destined to have a great future, attaining its finest development before the nineteenth century at the hands of Metastasio (1698–1782). The *commedia dell' arte* began to degenerate by 1700 and finally lost favor even with the lower classes. Goldoni (1707–1793) put an end to it when he began to produce his light comedies depicting the elegant upper class social life of Venice. Churchmen as a group disapproved of the scurrility and obscenity of the popular comedy, nor did they favor the irreligious and frequently questionable character of the more serious drama. In consequence, the church fostered the oratorio, or musical prayer, first introduced by St. Philip Neri. Soon the oratorio was dramatized in somewhat the manner of the morality plays of the closing Middle Ages. The first of such religious dramas, produced in 1600, was the *Representation of the Soul and the Body*. Its characters were Body, Soul, World, Pleasure, Time, and Death. This sort of drama found numerous imitators, for example, Vondel (*d.* 1679) in the Netherlands.

Portugal. Baroque art also triumphed in Portugal. That country had become prosperous, for the voyage of Vasco da Gama in 1498 around the Cape of Good Hope to India was followed by the establishment of a Portuguese monopoly of the prized articles of luxury that formerly had reached the markets of Europe through Venice. Thenceforth, Lisbon was the chief center for the distribution of spices, drugs, and other choice goods. The Portuguese became wealthy at the expense of Italy but in turn lost these advantages when intrepid Netherlandish sailors and freebooters began to sail to the East Indies on their own account and seized Celebes, Java, and the Moluccas. The greatness of Portugal did not outlast the sixteenth century, but one literary monument to the stirring days of Portuguese exploration and conquest was produced—*The Lusiad.* Its style is patterned on that of Vergil's *Aeneid.* The author, Luis de

Camoëns (1524–1580), sailed along the water route to India, retracing the voyage of Vasco da Gama. In his poem, he used his firsthand impressions as a rich background for his theme.

Spain. Although Italy enjoyed cultural leadership in Europe, Spain dominated the political stage. By the marriage of Ferdinand and Isabella in 1469 the kingdoms of Aragon, Castile, and León had been united. In 1492, Isabella conquered Granada, the last of Spanish lands still subjected to Moorish rule. On the death of Ferdinand (1516)—Isabella had predeceased him by 12 years—Spain, the Americas, Milan, and Naples and Sicily passed to Charles, grandson of Ferdinand and Isabella, who was to acquire many more lands, all by inheritance. From his father, he received the Netherlands, important because of their commerce, industry, and central position in Europe. When his grandfather, the Emperor Maximilian, died in 1519, Charles succeeded him as duke of Austria and was elected to succeed him as emperor of the Holy Roman Empire, which included not only Germany but the kingdom of Lombardy in northern Italy as well. Thenceforth, he was known as Emperor Charles V.

Philip II, who succeeded his father Charles V in Spain, the Netherlands, Milan, Naples and Sicily, and the Americas and ruled from 1556 to 1598, was one of the greatest monarchs of his age. His armies were regarded as invincible, for the Spanish pikemen defeated the infantry of every country. He worked hard to supervise every act of government, thus becoming the model of modern royal absolutist rulers. An ardent Catholic Christian, he labored to uproot every vestige of heresy. With a political iron in every fire, he actively promoted his interests by war and diplomacy. Generally misunderstood by subsequent generations and usually misrepresented, he nevertheless was an able, a conscientious, and a truly national ruler, whose reign marks the golden age of Spanish culture.

Engaged in exhausting wars with England and especially with her subjects in the Netherlands, Spain nevertheless developed a remarkable culture. The country was never troubled by Protestantism and the attendant internal dissensions. The great religious figures of Spain were Catholics and mystics, such as Ignatius de Loyola whom we have studied in connection with the Reformation. Scholastic philosophy, little studied in other lands during this time, continued to flourish at such universities as Salamanca, Coimbra, and Alcalá. The Jesuit Suárez (1548–1617) and the Dominicans Melchor Cano (1509–1560) and John of St. Thomas (1589–1644), to mention only three names, became famous scholastic philosophers. Contrary to statements often made, Spain displayed great intellectual activity during this period.

Spanish Painting; El Greco. Chief among the glories of Spain was its school of painting. Like other Europeans, Spaniards felt the

charm of Italian painting and succumbed to its influence. The most prominent painter in Spain to employ the artistic ideas and methods of Italians toward the close of the seventeenth century was not a Spaniard but a Greek from Crete who had spent some time in Venice, where he studied under Titian, and in Rome, where he became acquainted with the manner of Michelangelo. This was Domenico Theotocopuli

FIG. 95.—"Burial of the Count of Orgaz," by El Greco.

(1548–1615) or El Greco, "the Greek," as he became popularly known. Shortly after 1570, he took up his residence in Toledo, the religious capital of Spain, where he embellished the city with magnificent canvases. His paintings reveal Byzantine, Venetian, and Roman influences and herald the new style of baroque art in Spain. A notable example is the "Burial of the Count of Orgaz." The count's body is supported by St. Stephen and St. Augustine. A Franciscan friar stands by in mournful

prayer as one priest reads the service and another holds a cross. Nobles, relatives and friends of the count, attend the rites. A priest in ecstatic pose looks up into the skies and beholds angels carrying the count's soul to Christ, who is surrounded by a heavenly host among whom are the Virgin, St. Peter, and other saints.

The faces of the men in the funeral cortege are splendid portraits, possessing the psychological intensity, especially of a deep religiosity, that is characteristic of baroque art and the rapt-faith of the Spaniards of that time. El Greco loved to subordinate general design and particular objects to the demands of emotional intensity, a feature especially characteristic of his later work. Figures are elongated and appear to sway in rhythm, action is vigorous, and sharp contrasts in color and design are common. The riot of color heightens the impression of vehement feeling. For a long time, El Greco was not well understood; his reputation has developed only in recent times. It was long assumed that he was insane; the truth is that he took liberties with his figures in order to emphasize the emotional theme he wished to illustrate. His large canvases require much study; perhaps his smaller pictures should be studied first. A good example of the latter is his "Jesus Bearing the Cross." The Saviour's elongated fingers, upward glance, and suffering face, the crown of thorns, and the burdensome Cross all illustrate El Greco's vehement intensity.

Caravaggio's Influence in Spain. Caravaggio was influential in Spain, where his example was imitated by such painters as Ribera and Zurbarán. Ribera (1588–1656) of Valencia studied in Naples. To this fact he owed his preference for everyday subjects like old men and especially beggars, of which Spain was full. He was so strenuous a realist that the adjective ferocious well describes his style. Like Caravaggio, he used dark backgrounds. One of his followers, Zurbarán (1598–1662), was called the "Spanish Caravaggio." The "Dominican Monk in Prayer" illustrates his style and also something of the tense religious zeal current in Spain.

Velásquez and Murillo. The foregoing artists were too deeply influenced by Italian ways, however, to be truly Spanish. Significant as they may be, they were surpassed by Velásquez (1599–1660), one of the greatest of painters. His intense realism, little influenced by Italian conceptions, resulted in a pictorial catalogue of Spanish social types. An example is his "Maids of Honor in the Spanish Court of Philip IV." He also painted portraits and religious pictures showing the Crucifixion and other scenes from the life of Christ. Murillo (1618–1682) wielded a less vigorous brush. He was devout, sentimental, and only occasionally realistic. There is a dreamy tenderness about some of his pictures, as in "The Immaculate Conception," that has made his pictures universally

popular. But it was Velásquez who influenced art in other lands, particularly the Netherlands.

Spanish Literature. Spanish literature boasts a number of great names during this period. Lope de Vega (1562–1635) wrote an astounding number of tragedies and comedies. He and Calderón (1600–1681) followed the Italian Renaissance tradition in regard to plots, scenes, and the limited number of actors. These writers, however, were surpassed in significance by Cervantes (1547–1616), the author of the immortal *Don Quixote*. This book is a biting satire on the admiration still felt in Spain for the chivalric romances of the Middle Ages, even to the point of shaping habits of life according to the virtues set forth by their heroes. Since chivalry had long outlived its usefulness, this appeared ridiculous to Cervantes. With matchless satire, he described the adventures of Don Quixote, tracing his career through extraordinary incidents and describing them with mock-heroic gravity and in witty dialogue and ludicrous episodes. The result is Spain's literary masterpiece and one of the world's great books.

Decline of Spain. Every reader of history knows of the decline of Spain during the seventeenth century. Corruption and demoralization were evident on every hand, for which bad government was partly responsible. Long wars with the Netherlands and England ruined the treasury. The defeat of the Armada in 1588 spelled financial ruin even though the country was mercilessly taxed. There was no prosperity; towns did not grow, and a vigorous class of tradesmen and manufacturers such as existed in the Netherlands did not develop. Spain remained a land of peasants and nobles, poor and economically backward. The importation of gold and silver from Mexico and Peru did not help its industries. This money was lavishly spent in the support of the army and navy and in prosecuting costly wars like the long struggle with the Netherlands. The royal family also declined; writers who like to speculate on the basis of the ideas advanced by eugenists believe that they find in the history of the Spanish royal family facts to substantiate their theories. Relatives intermarried, and thus characteristic family defects were exaggerated. Hence, Charles II, who ruled from 1665 to 1700, was mentally incompetent; he was afflicted with cretinism, his head unduly large, his jaws so misshapen that he could eat only with difficulty, his tongue too large for his mouth, and his mental age that of a child.

England; Age of Elizabeth. England was blessed by the strong and peaceful rule of Elizabeth from 1558 to 1603. The question of religion was settled by the establishment of the Anglican church in 1563, when the state adopted the Thirty-nine Articles. With state and church so closely joined, there was little religious trouble to mar the

quiet of public life. The Catholic faith was proscribed, however, and a policy of repression maintained against itinerant Catholic priests and nonconforming ministers. Further, Elizabeth established a sound coinage, which won her the support of merchants and manufacturers. Men like Sir Francis Drake and Sir Walter Raleigh sailed to the West, plundering the Spanish colonies, robbing Spanish merchantmen, and laying the foundations of overseas trade and colonization. Prosperity was mounting, there was much luxury, the upper classes indulged in lavish display,

FIG. 96.—"The Drinkers," by Velásquez.

and most subjects rallied to the support of the queen. The age is full of romantic episodes—the execution of Mary Stuart, the shattering defeat of the Armada, plots against Elizabeth's life, and the events arising from the relations of the English with the Dutch in their struggle against the Spanish Philip II.

LITERATURE. The literature produced during Queen Elizabeth's reign was the greatest of that day and indeed one of the most remarkable in all history. There was much exaggerated mannerism, as shown, for example, in John Lyly's *Euphues*. But the copious production of new histories, poems, sonnets, songs, comedies, tragedies, and historical plays rose to a level far above the mannerism of the time. The public read translations of the Italian, Greek, and Latin classics. Bacon's *Essays*, Hakluyt's *Voyages*, Hooker's *Laws of Ecclesiastical Polity*,

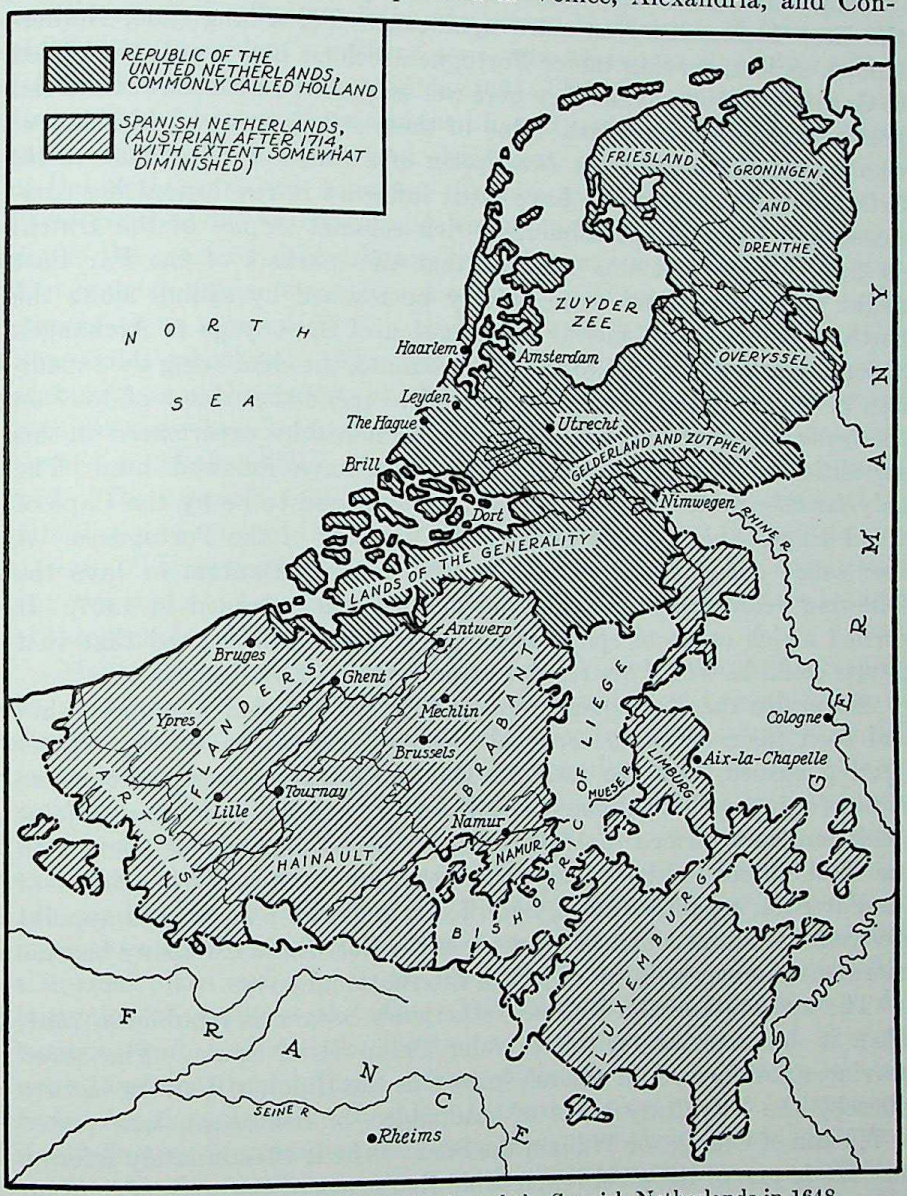
Foxe's *Book of Martyrs*, and various translations of the Bible were among the favorite reading of the period. But the great figures of the age were Edmund Spenser (*d.* 1599), Christopher Marlowe (1564–1593), William Shakespeare (1564–1616), and Ben Jonson (1573–1637). Spenser's *Faerie Queene* is a long poetic romance that reveals old and new influences and reflects the customs of the Elizabethan Age. Marlowe was a great dramatist who died before his thirtieth year. His *Jew of Malta* and *Tamburlaine*, like Jonson's plays, should be read because of their fine dramatic vigor and literary qualities.

William Shakespeare. The greatest of all English writers is William Shakespeare. His plays cover a wide range of subject. Among his best are *Romeo and Juliet*, a tragedy about adolescent love; *The Merchant of Venice*, a comedy on the miserliness of a Jew; *Othello*, a tragedy dealing with conjugal jealousy; *King Lear*, a tragedy on the faithlessness of children; and *Macbeth*, a tragedy based on murder. For insight into the motives of human beings, no writer has surpassed Shakespeare and few have equaled him. His historical plays concerning English kings are significant for patriotic reasons. Shakespeare, fortunately, did not follow Seneca, whose plays were used as models in Italy, Spain, and France. His tragedies, unlike those of Seneca and his imitators, have many characters and complicated plots, which often find their denouement in violent action.

The Netherlands. The Netherlands during this time likewise made noteworthy contributions to civilization. Situated at the mouths of the Rhine, Meuse, and Scheldt rivers, this group of little states occupied a position of commanding importance. From northern, eastern, and western Europe, goods of all kinds streamed to the ports of Bruges, Ypres, Ghent, Brussels, Antwerp, and Amsterdam. The seventeen provinces of the Netherlands rebelled against the tyrannical rule of Spain under Philip II. From 1572 a desperate war raged, which in 1609 resulted in the practical independence of the seven northern provinces, thenceforth known as the United Netherlands or more popularly as the Dutch Republic. The Southern Netherlands (Belgium) comprising Flanders, Brabant, and several other provinces were forced to remain loyal to Spain. The mouth of the Scheldt River was closed to commerce, and Antwerp, which since the fifteenth century had been the chief center of trade, languished. Economic stagnation ensued in the Southern Netherlands, but a brilliant prosperity developed in the United Netherlands.

During these eventful struggles commerce expanded remarkably as the merchants of the Dutch Republic sought new markets the world over. A glance at the map reveals that the Netherlands are situated near the very center of Europe; they lie on the busy routes of world

commerce, equidistant between Scotland and Italy and between Portugal and Finland. A trading station was opened at Archangel as early as 1584, and Dutch merchants operated in Venice, Alexandria, and Con-



MAP XXX.—The United Netherlands and the Spanish Netherlands in 1648.

stantinople. They went to the Cape Verde Islands and began a lucrative trade in slaves. Daring Netherlanders considered the ships of Spain fair prey wherever they were to be met. Netherlandish trade increased enormously so that by the close of the sixteenth century shipbuilding

was an important industry. There were said to be as many as twenty-five or thirty thousand Dutch sailors in active service.

Important as was this trade with other parts of Europe, traffic with the East Indies was even more significant. For a long time, Netherlandish sailors, serving under Portuguese colors, had repeatedly sailed to Goa and Calicut so that they were well acquainted with the commercial possibilities in the Far East. One of these sailors was van Linschoten, who in 1595 published his *Description of Portuguese Navigation to the Orient*, a book that was to have great influence in revolutionizing commerce and building the fabulously rich colonial empire of the Dutch. At first, however, it was believed that the markets of the Far East might more safely and more quickly be reached by sailing along the north coast of Russia, merely an extension of the voyage to Archangel. Several efforts were made to explore this route, the chief being the expedition of Willem Barents, who was forced to spend the winter of 1597 on the bleak island of Novaya Zemlya. The hardships experienced on this expedition discouraged others who might have followed him. The only feasible route to the Far East now appeared to be by the Cape of Good Hope, which meant braving the hostility of the Portuguese. A fleet sailed out under Houtman in 1595, reached Bantam in Java the following year, and, after suffering many losses, returned in 1597. It carried a rich cargo of spices and other goods which showed that vast profits could be won from regular trade with the East Indies.

Naturally the Portuguese refused to yield the rich monopoly that had been theirs since the epochal voyage of Vasco da Gama. Bitter fighting ensued, but the intrepid Dutch navigators were everywhere successful in expelling them. The Dutch East India Company, a joint stock company formed in 1602, was to have a monopoly of trade with the East Indies, with the right to negotiate treaties with princes of the Far East, organize troops, build forts, maintain a navy, and appoint governors. In the course of a few years the East India Company became enormously prosperous, an object of international envy.

The new state of the United Netherlands became a republic in 1581, when it deposed the legitimate ruler Philip II of Spain. The seven provinces had formed an alliance known as the Union of Utrecht in 1579 whereby the hereditary office of stadholder, or lieutenant, was vested in William of Orange, or William the Silent as he is affectionately referred to. He is one of the most remarkable characters of the century, and his long struggle with Philip II beginning in 1567 imparted undying splendor to his personality. The Union of Utrecht was a weak organization because final action on most state matters rested not in the States-General, which met in The Hague, but in the provincial states. William of Orange showed himself a great diplomat in bringing order out of

political chaos, and his relief of the siege of Leiden in 1574 firmly established his right to military leadership. His death in 1584 by an assassin hired by Philip II made him a martyr.

Direction of military affairs now passed to Maurice of Orange, one of William the Silent's brilliant sons, who served as stadholder of the United Netherlands from 1584 to 1625. Having studied at the new University of Leiden, he was trained in mathematics, to which he seems to have owed his precision and orderliness. Maurice of Orange is one of the world's military geniuses. To him more than to anyone else is to be ascribed the success of the Netherlandish army. It was without doubt the most efficient military organization the world had yet seen. The Spanish armies were large, irregularly paid, and poorly fed, as the officers often appropriated to their own use the money intended for wages and provisions. This produced discontent and led to violent outbursts, as in the case of the "Spanish Fury" in 1576, when, maddened because they had been ill treated, the soldiery plundered Antwerp, burned buildings, killed citizens, and seized what wealth they could find. The Spanish soldiers were professionals, violent, indifferent to suffering and to any injustice they might inflict, and difficult to discipline. The Spanish pikeman still was formidable, but the army could not or would not adapt itself to the new conditions it had to face because of the genius of Maurice of Orange.

Maurice's system was to have but a small force, no larger than could be paid, clothed, and fed regularly. Everything was organized on a budget, the sum of money available being voted by the States-General for a given period in advance. Consequently, Maurice was able to maintain effective discipline, and any violation of rules was promptly punished. Companies were thoroughly drilled in the most complicated evolutions. There were about 150 of these companies, each containing 120 men. The Dutch army at this time therefore rarely numbered more than 18,000 men. One-third of each company were provided with the usual pikes and swords, but the rest carried muskets, a weapon just beginning to supplant the pike. The soldiers also were trained to dig trenches and canals, drain moats, sap walls, undermine and blow up gates, and construct bridges. Some of this work was done by laborers levied for the purpose. In spite of its small size, Maurice's army was most effective in defending the boggy regions of the Netherlands. As a result, the Spaniards could not withstand Maurice's sieges and lost many towns. Maurice's artillery also was the best of the time. His genius was so admired that youths came from all parts to study the secret of his successes.

Cosmopolitan Character of Netherlandish Culture. No other land north of Italy was so highly urbanized as the Netherlands. Amster-

dam, Rotterdam, Leiden, Haarlem, The Hague, Delft, Utrecht, and Middleburg were justly renowned for their wealth and beauty. Life in the United Provinces was predominantly bourgeois, not noble and feudal as in Spain, and there was much comfort in the homes of the middle class. It was practical, sober, industrious, and cosmopolitan because Dutch merchants sailed the seas and came in contact with peoples of every part of the world.

The United Provinces made no great effort to establish religious uniformity. The Reformed church was the official religious body, but other sects were tolerated. Even the harassed Anabaptists, now called Mennonites, were not molested. Catholics were permitted to worship according to their ancient ritual, provided that they did not carry their practices into the open. Small wonder that the United Provinces became a haven of refuge for oppressed religious groups. The English Pilgrims lived in Leiden for some years under their leader John Robinson, whose body lies buried in St. Peter's Church of that city. Jews from Portugal flocked to the Dutch cities. Protestants of the Southern Netherlands also came in great numbers and formed the Walloon church, which is still in existence. Later, under Louis XIV, the refugee Huguenots flocked to this land of freedom, as well as to Prussia and England. Many political offenders also found a ready welcome. John Locke, the English philosopher, and the third Earl of Shaftesbury, a prominent Whig, lived there for some time.

Centrally situated in Europe, immensely rich because of its monopoly of trade with the East Indies, possessing an energetic class of townsmen, and fortunate because of the policy of the government in religion, the United Netherlands began to lead Europe in cultural matters. Founded in 1575 to commemorate the resistance of the citizens of Leiden against the Spaniards, the University of Leiden was attended by students of many lands attracted by the fame of its excellent instruction in medicine, theology, and letters. The University of Utrecht, established in 1636, drew many students in law. Printing flourished, as was inevitable, for the government never attempted to suppress undesirable books. Thus the works of Crellius, a learned follower of the Sozzini, the radical religious reformers of Italy, were printed freely in Amsterdam. Very often, however, a false place of printing was given on the title pages; in the case of Crellius's work it was Eleutheropolis, or "Free Town." It was during this time that the Elzevir press in Leiden became famous.

Of all the great Netherlandish scholars perhaps the most typical is Hugo Grotius of Delft (1583–1645). At the age of twelve, he was sent to the University of Leiden, where he attracted favorable attention. His fame rests chiefly upon his work in international law. Ever since the close of the Middle Ages, international relations had been conducted with

scant regard for the moral rights of nations; expediency was the chief consideration in the minds of princes. The sixteenth and seventeenth centuries were characterized by brutal wars carried on with shocking cruelty. The ideas that Machiavelli had set forth in his *Prince* vitiated international morality.

As a cosmopolitan people who traded with all nations, the Netherlanders were especially interested in opposing this anarchy in international relations. Thus Grotius affirmed that international law should

FIG. 97.—"The Gay Household," by Jan Steen. (*Courtesy of the Netherlands Railways.*)

be founded on the general belief in morality, justice, and humanity. He also opposed the right of nations to rule the sea as if it were part of their own territory, declaring that men have a natural right to go to and from their homes in quest of a living. England, for example, claimed title to the Strait of Dover and the North Sea, holding that fish in those waters belonged to the subjects of England and Netherlanders might not catch them! Grotius wrote a book called *Mare liberum*, or *The Open Sea*, in which he argued that the sea was for the free use of all peoples, a doctrine that subsequently was everywhere adopted. He also wrote the *De jure belli ac pacis*, or *On the Law of War and Peace*, stating the general principles of human rights in time of war and peace by which international

relations should be governed. Through these books, Grotius became one of the founders of modern international law.

NETHERLANDISH ART: GENRE PAINTING. No aspect of Netherlandish culture is better understood or more deeply appreciated than its painting. A multitude of artists appeared, of whom many were talented and some were geniuses of the highest order. To understand Netherlandish art, we should grasp the fact that the nobility played only a meager part in the life of the country and that its merchants and manufacturers determined the cultural tone. The opposite of French art, which was designed to please a noble and parasitic class living on the labor of the majority, Dutch art arose from the life of an industrious town-dwelling class. Scenes of city life, markets with flowers, fruit, fish, meats, and jostling crowds, mountebanks, taverns, quiet streets, quays, shops, rural scenes, domestic interiors were favorite themes. This sort of art is commonly called "genre," which means the realistic handling of intimate scenes of everyday life. Never before had such still-life motifs as flowers, dead game, birds, animals, fruit, and rich fabrics been so well rendered. Of all the genre painters, few were as successful as Jan Steen (1626–1679), whose humorous pictures of the intimate Dutch life of his day have never ceased to amuse succeeding generations. Portrait painting, which often belongs to the genre style, also was most popular in a country of bourgeois people proud of their family achievements. Landscapes, too, were popular. With the exception of the Neapolitan Salvator Rosa (1615–1673), no landscape painters had previously devoted entire canvases to scenes of nature.

Religion was not nearly so marked a feature of Dutch as of Italian or contemporary Flemish art. As Calvinistic Protestants the Dutch interpreted the Ten Commandments—especially the Second—with great literalness. Therefore they repudiated the Catholic practice of pictorial and sculptural representations of the Virgin and saints, which they thought contributed to idolatry.

THE HAARLEM SCHOOL: JACOB VAN RUYSDAEL. Haarlem produced a noteworthy school of landscape artists and portraitists. Jacob van Ruysdael (*d.* 1682) was the most significant landscapist of the Netherlands next to Rembrandt. He had the remarkable gift of seeing and depicting the essentials in a landscape. His best pictures deal with the Dutch towns and countryside in which he had lived ever since his youth. Especially famous is his "View of Haarlem," in which two-thirds of the canvas is devoted to the cloudy Dutch sky interpreted in marvelous fashion. It presents a peaceful countryside of fields, houses, trees, windmills, and peasants at work. In the distance against the horizon looms the city of Haarlem with its buildings, in the center of which stands the church of St. Bavo, the proud monument that is still

the glory of the old city. Even better known perhaps is his "Mill near Duurstede." The placid stream, the sky mottled with patches of color, the town lying in deep shadow, and the tall mill near it lighted by straggling beams from the declining sun reveal the poetry of Dutch landscapes.

FRANS HALS. Even more versatile than Ruysdael was Frans Hals (*d.* 1666), who spent his life in Haarlem and knew well the grave burghers who posed for him. His pictures are important for the student of the history of the United Netherlands because he painted numerous portraits

FIG. 98.—"Mad Babbe," by Frans Hals. (*Courtesy of the Metropolitan Museum of Art.*)

and groups of leading townsmen. His paintings are vastly more important, however, from an aesthetic point of view than as portraits, for Hals was preeminently an artist. Like Velásquez, he had a remarkable faculty for seeing essentials. His pictures contain those few details necessary for a vivid portrait—a striking sash, a bright smile, or an animated face. Hals's manner of seeing his subjects and his way of putting them on canvas are impressionistic. In fact, the Impressionists after 1865 were profoundly influenced by his technique.

THE DELFT SCHOOL: JOHN VERMEER. The Delft school produced one artistic genius of the first rank, Jan Vermeer (1632–1675). His best-known pictures are the "Head of a Young Girl," the "Young Woman with a Water Jug," and the "Young Woman at a Casement"; the last hangs in the Metropolitan Museum in New York. The first is a portrait of the utmost simplicity done in strikingly contrasting colors of blue and

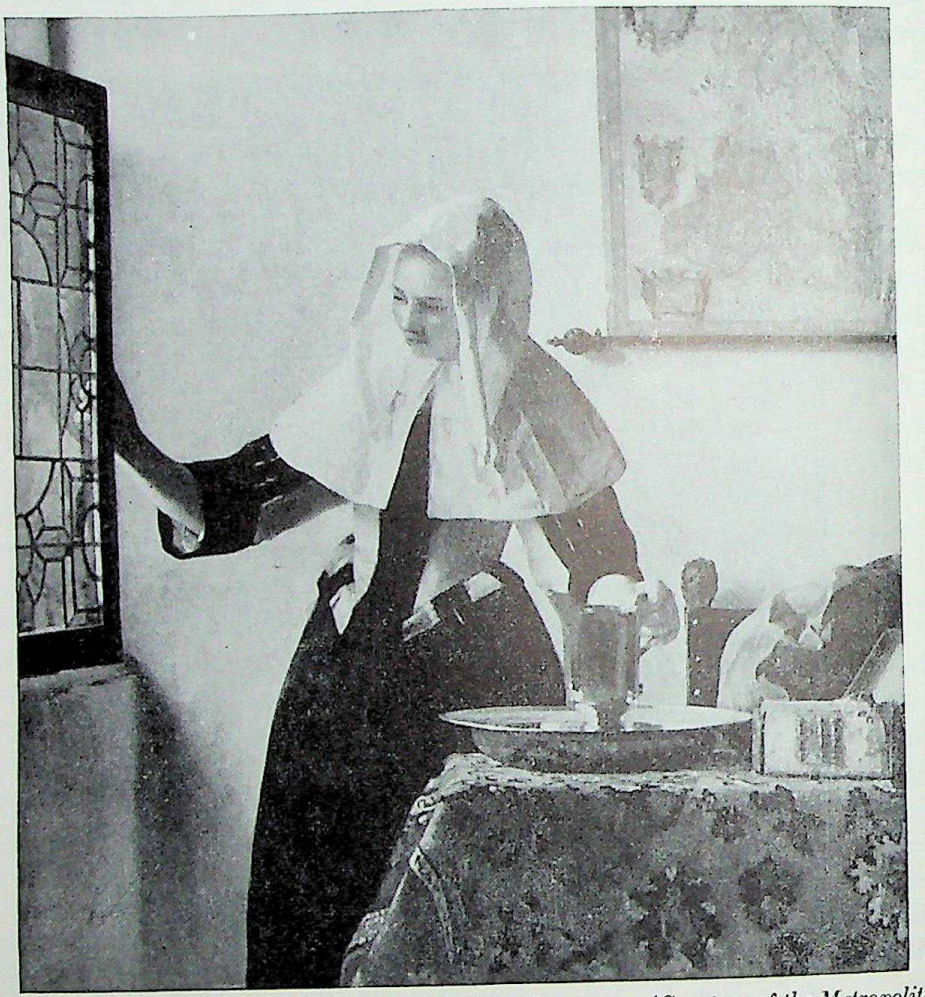


FIG. 99.—"Young Woman with a Water Jug," by Vermeer. (*Courtesy of the Metropolitan Museum of Art.*)

yellow, a marvelous composition of ovals. The girl's face has an inquiring and arresting look, which contrasts strongly with the rest of the picture, from which all nonessential details are eliminated. The second, a scene from everyday life, shows a young woman standing by a window; on the table by her side are portrayed a number of still-life objects. Though he was always admired, Vermeer's influence and reputation have con-

stantly risen, especially during the past seventy-five years. He portrayed his subjects as if enveloped by the natural light outside the studio and endeavored to render faithfully the varied colors, balanced and unified by the diffused light of the open air. The Impressionists of the past century admired this *plein-air* method and employed it with greater or less success. Another quality of Vermeer was his vigorous realism, which led him to reject nonessentials and limited his pictures to impressions that the eye first receives as it falls upon the subject.

The Amsterdam School: Rembrandt van Rijn. There were other schools such as that of Utrecht, noted for its still-life scenes of game birds, animals, fowl, and flowers, and that of Leiden, which produced a great variety of artists. But the Amsterdam school towered above them all. Amsterdam was large and rich, a center of world trade. It could afford patronage to most of the artistic geniuses of the Netherlands. One of these was a master of the greatest virtuosity, Rembrandt van Rijn (1606–1669). Born in Leiden, where he began painting, he moved to Amsterdam, there to win his great reputation and die in penury. Like other Dutch artists, he adopted the manner of Italian masters of the preceding century, especially that of Caravaggio. He had a strong sense of realism and a profound affection for scenes of everyday life. He despised those popular tastes which made possible the genre painting of the little Dutch masters. Much as he loved the texture of costly stuffs and the gleam of fine jewels, he used them not for themselves, but to enhance the impression that he thought a subject should make upon the beholder. He understood better than any of his predecessors the witchery of light falling upon a face or shoulders; deep shadows and high lights helped him to emphasize essential and poetic truth. These features of Rembrandt's art, like Hals's and Vermeer's, exerted a subtle influence on many modern painters.

Rembrandt painted portraits, landscapes, and large groups. Many examples might be mentioned, but the portraits of his mother, himself, and his wife are especially notable. His landscapes are poetic renderings of the Dutch countryside. The etching known as the "Landscape with the Three Trees" is a view of the grassy polders beyond which one sees a city silhouetted against the sky. In his twenty-fifth year, Rembrandt painted the famous "St. Simeon in the Temple." In the spacious recesses of a church appears St. Simeon illumined by a mysterious beam of light. This picture is important in respect to the painter's development; it is the first instance of his ability to create a composition out of colored light. In the following year, 1632, he produced his "Lesson in Anatomy," remarkable for its realism. Ten years later appeared "The Night Watch," which portrays a company of soldiers setting out from their quarters. In this picture, Rembrandt returns to the ideas he had

employed in "St. Simeon in the Temple." The mysterious play of colored light falling upon the main personages produces an unforgettable impression. Toward the end of his life, Rembrandt painted "The Syndics," in which the subjects are posed around a table. Their serene expression, rich clothes, and dignified bearing are eloquently brought out by the bewitching power of color. Such are but a few of the great master's numerous productions. No brief sketch can possibly do justice to his amazing power.

FIG. 100.—West Church in Amsterdam (seventeenth century).

NETHERLANDISH ARCHITECTURE. The Dutch exerted much influence in architecture, especially over northern Germany and Scandinavia, regions with which Dutch merchants carried on an active trade. Private houses and municipal buildings were built of brick with crow-stepped gables facing the street. The town hall of Bolsward is one of the finest examples of the latter, clearly showing the wealth of provincial Dutch towns. The Butchers' Hall in Haarlem is better known and illustrates the taste for baroque architecture in public as well as private structures.

PAINTING IN THE SOUTHERN NETHERLANDS. In contrast to the secular painting of the masters in the north, the art of the Southern

Netherlands, or modern Belgium, was Catholic in spirit. The Catholicism of the people is well exemplified in the pictures of Peter Paul Rubens (1577–1640) of Antwerp. A man of great versatility and enormous energy, he studied in Italy, was fully conversant with the work of the

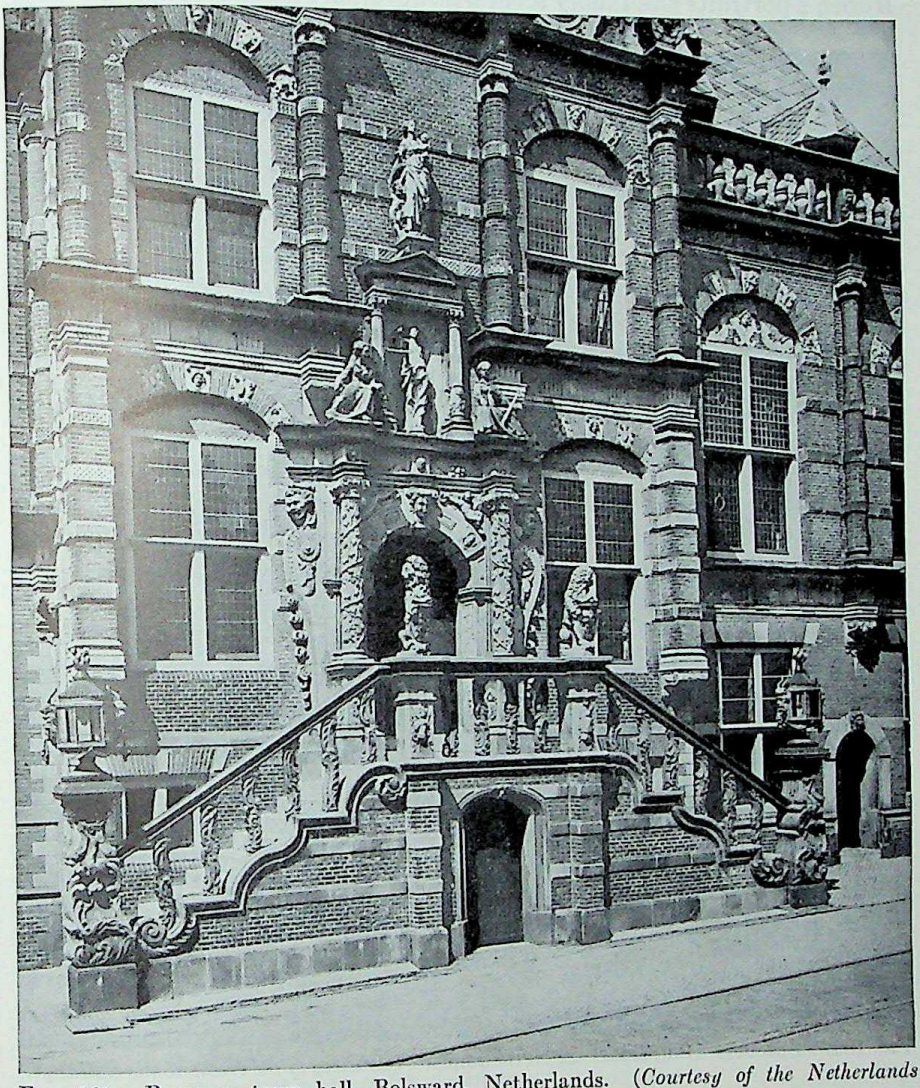


FIG. 101.—Baroque town hall, Bolsward, Netherlands. (*Courtesy of the Netherlands Railways.*)

great masters of the late Renaissance, and owed much to Michelangelo, Caravaggio, the Venetians Titian and Tintoretto, and the School of Bologna. On the other hand, such illustrious Flemish predecessors as van der Weyden and Breughel exerted slight influence upon him. He established a workshop employing many assistants, a mass-production

system that accounts for his numerous pictures. His "Crucifixion" and "Descent from the Cross," which adorn the cathedral of Antwerp, are among his most notable works. They possess an Italian grandeur and show vigorous action, use of light and shade, and superb anatomy. Ruben's portraits and family scenes, however, are more typically Flemish.

FIG. 102.—Butchers' Hall, Haarlem, Netherlands. (*Courtesy of the Netherlands Railways.*)

Very different was his contemporary Anthony Van Dyck (1599—1641), also of Antwerp. Ruben's productions often were somewhat coarse, but Van Dyck's always remained refined. The latter liked delicate features and hands, fine cloths, laces, and costumes that sometimes appear too elegant. A delicate realist, he possessed neither the bold vigor of Rubens nor the profound and poetical insight that charac-

terized Rembrandt. Van Dyck's art pleased aristocratic circles and reflects the dominant social characteristics of an aristocratic society. His portraits of the children of Charles I of England are a case in point.

Diverse tendencies characterized the Baroque Age, and yet certain features were common in nearly every part of Europe. In art, it exhibited supreme excellence in every aspect of technique as perfected by the Italian Renaissance. The Bolognese school set the fashion in taste for rhetorical, sophisticated, and finished perfection. In religion, particularly in lands that remained true to the Catholic faith, the church, under papal and Jesuit leadership, emerged triumphant. The art of Rubens eloquently proclaims the strength of Catholic conceptions among the people of Catholic communities. In Protestant lands where there was much religious dissension, the artistic impulse was secular and best expressed, particularly in the United Netherlands, by the virtuosity of Rembrandt, Hals, and Vermeer. In general, society in the north was bourgeois and commercial, in the south aristocratic and religious. Government was absolute, based on the theory that monarchs ruled by divine right. Even in the so-called "republic" of the United Netherlands, the aristocracy of wealth prevailed among the exclusive burghers of Amsterdam. Such characteristics, everywhere noticeable in Italy, Spain, and the Netherlands, also were evident in England and Germany. Throughout Europe the Baroque Age exemplified a new spaciousness of living, a new luxury of leisure, and an overblown exuberance.

FOR FURTHER READING

BARNOUW, A. J.: *Vondel*
BLOK, P. J.: *History of the Dutch People*, Vols. III and IV
CAFFIN, C. H.: *The Story of Dutch Painting*
———: *The Story of Spanish Painting*
CLARK, G. N.: *The Seventeenth Century*
COLLISON-MORLEY, LACY: *Italy after the Renaissance*
CONWAY, B. L.: *The Condemnation of Galileo*
FRANK, BRUNO: *A Man Called Cervantes*
GRANT, A. J.: *The French Monarchy*, 1483–1789, Vol. I
HARRISON, FREDERIC: *William the Silent*
HUME, MARTIN: *Philip II of Spain*
KANE, E. K.: *Gongorism and the Golden Age*
KIMBALL, FISKE, and G. H. EDGELL: *A History of Architecture*, Chap. XI
MARIÉJOL, J. H.: *Philip II*
MOTLEY, J. L.: *History of the United Netherlands*
NEALE, J. E.: *Queen Elizabeth*
ORNSTEIN, MARTHA: *The Role of the Scientific Societies in the Seventeenth Century*
PETTOELLO, DECIO: *An Outline of Italian Civilization*
PIJOAN, JOSEPH: *History of Art*, Vol. III
SITWELL, SACHEVERELL: *Southern Baroque Art*
VAN LOON, H. W.: *R. V. R.* (A biography of Rembrandt.)
———: *The Golden Age of the Dutch Navigators*

Chapter XXXVII

THE BAROQUE AGE: ASCENDANCY OF FRANCE

Culture is human history writ large; it is an historical science.—G. A. Dorsey

THE age of Louis XIV, during which France assumed the cultural leadership in European life hitherto enjoyed by Italy, Spain, and the United Netherlands, marked the closing phase of the Baroque Age. Although potentially a prosperous country with much rich soil and a numerous population, France was not in a position to play a leading part in European civilization during the century that closed with the accession of Louis XIV in 1643. The Reformation produced bitter civil wars from 1562 to 1598 that ruined French prosperity.

In this period of confusion, however, there were two significant writers, Jean Bodin (1530–1596) and Michel de Montaigne (1533–1592). Moved by the wars and the misery of the time, Bodin reflected on the problems of finance and government. He advocated, in his *Six Books on the State*, a strong monarchy because it could look after the common welfare better than any other form of government. The state should take an energetic hand in public business and industry. A high tariff on manufactured articles and low duties on raw materials and foodstuffs would stimulate business. But while monarchs were to be given the widest power in governmental administration, they were to remain subject to the laws of the realm.

Montaigne, who represented the learning of the Renaissance, exercised a much wider influence on the thought of the time. In his *Essays*, a collection of short prose compositions, he discoursed entertainingly on all manner of topics. Formerly men like Erasmus had optimistically believed in the perfectability of man; but Montaigne, who saw so much misery about him, was disillusioned and skeptical. Not expecting a utopia, he adopted a critical attitude toward institutions and accepted opinions.

Rise of Richelieu. Although the Edict of Nantes in 1598 kindled hopes for peace, the Huguenots, as the French Protestants were called, continued to make trouble. The edict had granted them important liberties—freedom to worship in all but a few cities including Paris; liberty to hold political meetings or parliaments; and even permission to garrison certain towns as, for example, La Rochelle. The edict did not

create liberty of conscience; the state made a virtue of necessity by conceding to the Huguenots the right to hold their peculiar tenets and regulate their lives accordingly.

However, not all Huguenots were satisfied. There were hostility and prejudice, and the Huguenot nobles were ambitious to increase their political power. Settlement of this problem was effected by Richelieu (1585–1642), who ranks with Henry IV and Louis XIV as a statesman of the first importance. Trained for the church, he became bishop at twenty-one. He was able, farseeing, and ruthless in the way he suppressed special interests that were hostile to the well-being and power of the French crown. Although physically weak, he displayed amazing energy. His chief idea was to make the royal power supreme; this meant that the privileges of the Huguenot nobles as well as others had to be curbed drastically. Richelieu succeeded in this difficult task, thus laying the foundations of the royal absolutism in France that we associate with Louis XIV.

The Huguenots rebelled in 1625, shutting themselves up in the strongly fortified city of La Rochelle, and Richelieu, now chief minister of Louis XIII, who ruled from 1610 to 1643, promptly put down the revolt. After a siege of 15 months, La Rochelle fell. With the rebellion stamped out, Richelieu in 1629 issued one of the most statesmanlike decrees in the history of the time—the Edict of Alais. It guaranteed Huguenots freedom of worship and conscience but took from them the political and military privileges granted by the Edict of Nantes. Soon after, he also destroyed the castles of the nobles, whether Huguenot or Catholic; their ruins today bear mute testimony to the iron resolution of the statesman who was reforming France. He even forbade dueling—an age-old custom of the nobility. When one of the nobles violated the decree by fighting in the very shadow of the Louvre, the royal residence in Paris, he was executed. There were to be no divided loyalties in France; nobles and townsmen, officials and subjects—all were to obey the king.

Louis XIV and His Court. Louis XIV's personality has always attracted interest. Polite and gracious in his personal relations, he was not a man of great intellectual ability. He had some appreciation of the arts, especially drama. His impressive appearance was enhanced by high-heeled shoes and an enormous wig. Like Philip II of Spain, he believed a king should supervise every act of government and consequently worked very hard at what he called the "craft of being a king." He believed that he ruled by divine right; God had appointed him to rule over France. He ruled absolutely, entrusting only matters pertaining to war, justice, and finance to special councils composed of obedient officials carefully chosen by himself.

Social life at the French court revolved about the person of the king. He was absolute; from him came all favors, to him all honors were to be paid. The morning began with the impressive royal *lever*, or "rising." Since the king as head of the realm was a public figure, this was almost a public ceremony. As the dressing progressed, attendants and nobles were admitted. First came the *grande entrée*, next the *entrée*, next the *chambre*, then the *antichambre*, and finally the rest of the court were admitted. It was a great privilege to assist the monarch in these personal duties. When the elaborate business of getting up and of breakfasting was finished, the king proceeded with the business of the day.

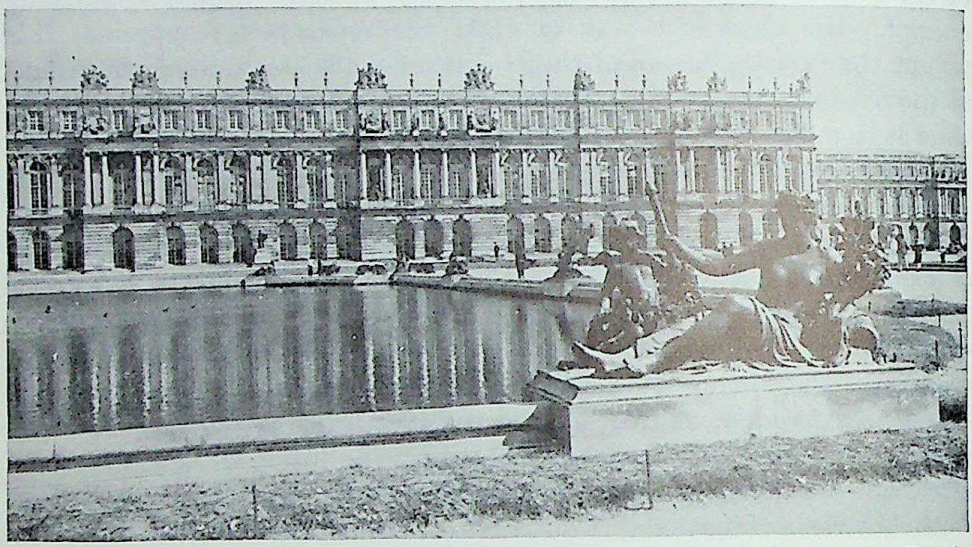


FIG. 103.—Chateau of Versailles (wing). (*Courtesy of the French Government Tourist Bureau.*)

After dining at one o'clock, often on a terrace in view of a select group, he went hunting or walking. Certain hours on specified days were reserved for the theater, which he dearly loved, or dancing or playing cards. At the close of the day the king retired according to another elaborate ceremony much like the *lever*.

Louis' court was a magnificent affair. Costumes were elaborate; silk, satin, and lace were used in abundance. Courtiers learned about the art of polite conversation and the paying of compliments. A multitude of formalities graced their lives. Nobles came from all parts of France to live at Versailles, a few miles west of Paris, where an immense palace was built that still speaks eloquently of the refined and aristocratic society of the absolute regimes of Louis XIV and Louis XV (1715–1774). The palace was large enough to house a thousand people. The impoverished nobles, proud of their long and illustrious ancestry, had been deprived of political power since the days of Richelieu. To compensate

them for these losses, Louis granted pensions that they might live in comfort at his court and securely under his eye. He also bestowed upon them posts in government, army, and church. Thus handsomely endowed, these privileged people lived on the fat of the land.

For us in democratic America it is hard to imagine why this aristocratic society was important for the culture of the day. In all European countries, many noblemen during the sixteenth and seventeenth centuries were rough and uncouth. They lived on their country estates, spent much time in hunting, and were not loath to fight. Study, music, literature, and refined life were unknown to many. Drinking to excess was common, and they often were deeply in debt. So far as France was concerned, the court life of the days of Louis XIV put an end to much of this crudity. When noblemen went to live at the polished court of Versailles, they became refined and exquisite. Every court in Europe tried to model its social life after that of Louis XIV; and though none could afford to, nevertheless they put forth the effort. What was even more important was the eagerness with which the *bourgeoisie* took over the polite ways and the social refinements of the French court. The manners of the age of Louis XIV became the accepted usage of the middle classes of Europe. Even in the American colonies, especially Virginia, the planter aristocracy fashioned its social conventions more or less after those of France under Louis XV.

Although Louis XIV's court undoubtedly rendered an important service to Europe in the development of a refined society, one should look at the debit side of the ledger. Blinded by the glitter and splendor of Versailles, historians have spared no words in praising it. But social ideals are constantly changing, and the understanding of social conditions is more profound today than ever before. To maintain this society of endowed aristocrats, the people of France paid a heavy price; it meant heavier taxes than the country had ever known. Almost the entire wealth of France was used to support in extreme refinement a relatively small class of privileged men and women. These no doubt contributed something to the well-being of state and society, but on the whole they became aristocratic parasites, interested in perpetuating their privileged position and increasing their pensions. All too often they forgot their social and political obligations. This is one of the reasons why in 1789 they were rudely shaken by the revolution of the middle classes, which no longer would tolerate such conditions.

Louis XIV revolutionized the court life of France—but was his government successful and efficient? Ruling by divine right, he formulated governmental policies; and consequently much depended upon his insight. Like Philip II of Spain, he was fond of flattery and judged a man's ability by his willingness to carry out orders; originality was not a prime requisite

for courtiers, councilors, and officials. If Louis XIV's officials were able men with original ideas, it was rarely because he had chosen them for that reason. During the last twenty-five years of his reign, they were more often mediocrities. Those of his earlier reign were generally able men because they had been trained under Richelieu's successor, Mazarin, who controlled policies during Louis's minority, that is, until 1661. One of these men, Louvois, reorganized the French army so that it became the most effective military force in Europe. Another able official, Vauban, was a military engineer whose labors helped Louis not only to win victories but hold the territories he won. Vauban's fortifications were so well constructed that modern artillery could destroy them only with difficulty. He laid the foundations for the system of military defense used until the First World War. Besides Vauban, Louvois had under him a group of able generals who won fame in the many wars waged by Louis.

Colbert and Colbertism. Greatest of Louis's ministers was Jean Colbert (1619–1683), controller general of the royal finances. His father was a draper, which meant that Colbert knew something about business and understood with what difficulty men create wealth. In other words, he belonged to the middle class, possessed the bourgeois virtues of thrift and industry, had a profound respect for the balancing of accounts, and was happy to work as much as fourteen hours a day. He believed that the prosperity of France, and hence the wealth and power of the king, could be increased only by advancing the economic interests of the mercantile class. Manufactures were encouraged by the state, and everything possible was done to stimulate commerce. Were these not the means by which the United Netherlands had amassed vast wealth? Tariffs were imposed to protect new industries. French ships were subsidized so that they could compete with foreign shipping while Dutch, English, and other ships were required to pay heavy harbor dues. France was essentially an agricultural land, but Colbert hoped to govern it as if it were a commercial country. Roads and bridges were constructed to stimulate commerce within the realm. The Languedoc Canal, about one hundred and sixty miles in length, was dug between the Mediterranean and the Bay of Biscay. It reached a height of eight hundred feet above sea level, the water in it being maintained by seventy-five locks. Colbert also directed industry by taking from the guilds power to regulate their own methods of manufacture.

Thus Colbert sought to increase the wealth of the land. But what was wealth? Mercantilists believed it consisted in the quantity of precious metal within a country. They held it was most statesmanlike to increase this quantity by every means possible. Hence the zeal with which they encouraged protective tariffs, subsidized shipping, and

limited imports. They thought that a country should import only raw materials while manufactured articles should be exported to bring precious metal into the country. Colonies were important because they produced raw materials and costly luxuries, which the upper classes of Europeans were willing to buy at good prices. Colbert looked with jealous eyes upon the monopoly of oriental goods possessed by the merchants of Amsterdam. He urged the securing of colonies and encouraged setting up trading posts in Africa and Asia, particularly in India. By such means, France was to become wealthy and independent of other powers. Such a realm would be able to compete with other countries; its king might safely defy the national enemies. But as Louis XIV could not understand these farseeing policies and no one at court liked rigid economies, Colbert was finally discharged in 1683.

Wars of Louis XIV. Ambitious to play a great part on the political stage of Europe, Louis XIV nearly ruined France as well as himself. Louvois had organized a most effective army, and Colbert was filling the royal treasury with money. Louis, himself a diplomat unsurpassed in his day, used his talents and the resources of France to extend the borders of his realm and dictate the policies of Europe. He launched four wars, as follows: the War of Devolution (1667–1668); the Dutch War (1672–1678); the War with the League of Augsburg, or King William's War as it is commonly known in America (1689–1697); and the War of the Spanish Succession (1701–1714). The story of these desperate struggles need not detain us; but it must be noted that Louis gained little territory by conquest in proportion to the treasure and blood spent. Taxation became onerous, and Louis lost his popularity. The severity of the winter of 1709, aggravated by the hardships of war, made matters worse. People died of hunger and cold, soldiers could not be paid because tax revenues had ceased. Even the courtiers, who had received many favors from the king, began to murmur. Taxation mounted, the public debt became burdensome, and poverty increased so that we may well ask whether Louis really was as great a monarch as historians have declared him to be.

Encouragement of Learning and Science under Louis XIV. The "Great Monarch" or the "Sun King," as Louis XIV came to be called, elevated France to the foremost place among European nations in respect to culture. He wanted to be known as a great patron of arts, letters, and science and was always ready to give pensions to men of achievement. Colbert, also interested in such matters, was even more anxious to support scientific projects and reward accomplishment. Louis gave an English physician named Robert Talbor a handsome sum for making known the medicinal values of quinine. Colbert helped the Académie française, established by Richelieu in 1634, and founded the

Académie des sciences, which still continues its work under the name of Institut de France. The *Journal des savants*, first French scientific journal, was established under Colbert's encouragement in 1665. An astronomical observatory was founded in Paris. Writers were pensioned, and foreign scientists, like Huygens of the Netherlands, were attracted to France.

French Painting. Louis XIV was deeply interested in painting; and, as a result of his influence, there developed a sort of official court art, the first in modern times. The taste of the moment was thoroughly Italian and classical. French artists studied in Rome and absorbed the ideas, themes, and methods of Italian artists of the Baroque Age. Nicolas Poussin (1594–1665) was the first great French painter to spend his life in Rome, painting classical scenes that might well serve as illustrations for the pastoral poetry of Vergil, of which his "Shepherds of Arcadia" is a good example. The figures possess the subtle gesture and ease of motion characteristic of baroque painting. But Poussin was not merely an imitator; his pictures are part of his own experience and are gracious and refined. They pleased the aristocratic circles, whose artistic tastes were fortunately steadily improving. Claude Lorrain (1600–1682) also spent most of his life in Italy. He came under Poussin's influence and liked to paint scenes from ancient history, as in "The Embarkation of the Queen of Sheba" and "The Landing of Cleopatra."

French Architecture: the Louvre and Versailles. Powerful princes are likely to be builders, and Louis XIV was no exception to this rule. During the early part of his reign, much attention was given to the completion of the Louvre, the royal palace in Paris on the right bank of the Seine. It had been started under Francis I a century before by the able architect Lescot. Mazarin brought from Italy the celebrated Bernini, who showed nothing but contempt for the work and plans of Lescot, which really were in excellent taste for they belonged to the earlier Renaissance. Bernini, ignoring all details, thought only of making great rooms for banquets and dramatic performances and did not concern himself about comfort, convenience, and lodging the inmates. When Colbert tried to guide the conceited artist, Bernini complained, " . . . He treats me like a little boy with all his idle talk about privies and underground conduits!" Bernini's successor was not much better, but Louis's flagging interest prevented him from doing further damage to the structure. It was the palace at Versailles that now engrossed Louis's attention. His chief architect, Jules Mansart, was a capable master who had proved his ability by putting the graceful dome on the Invalides in Paris. He also built country houses for the nobility and developed a

style that, while characteristic of the age of Louis XIV, was more sober than the baroque style of Italy.

French Sculpture and Gardening. The man who set the final style in decorative sculpture of the age of Louis XIV was Charles LeBrun (*d.* 1690), a skillful artist who unfortunately possessed little originality. His statues and decorations were too grandly eloquent and theatrical to give a feeling of reality; and as decorator of interiors he was overly fond of elaborate ornament.

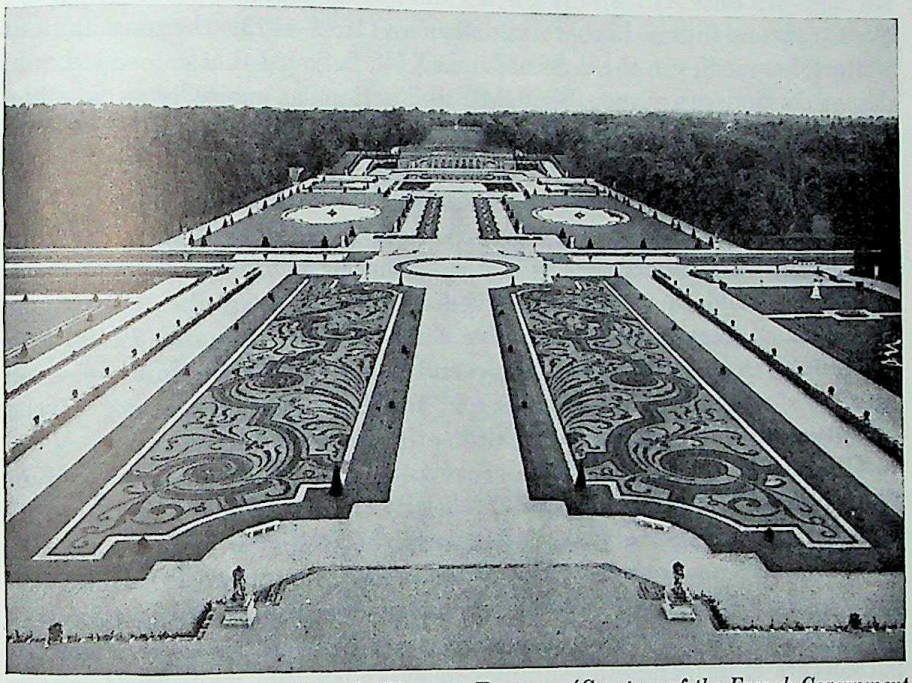


Fig. 104.—Formal garden, Vaux-le-Vicomte, France. (*Courtesy of the French Government Tourist Bureau.*)

Formal gardens, long in vogue in Italy, were now widely imitated in France. They were laid out in geometrical patterns with straight or curved lines, rows of neatly trimmed shrubs and trees, smooth plots of grass, arbors and trellises, fountains, evergreen trees, shrubs, flower beds, and pools, all ornamented with a superabundance of sculptured figures.

The Salon under Louis XIV. Women played a great part in the court life of Louis XIV, for social activities engrossed the courtiers. The rough life of soldierly noblemen disappeared in the society of elegant ladies. Silks, satins, laces, and elaborate costumes became popular. The *salon* was imported from Italy. This was an important social

institution, presided over by the great feminine characters of the day. Music, poetry, drama, prose, and polite conversation were assiduously cultivated in the *salon*.

French Drama. Louis XIV was intensely interested in the drama, and plays became a regular feature of court entertainment. Playwrights copied Italian models, which were based upon classical plays and characterized by small casts and simple plots. In these respects, such plays differ from the elaborate works of Shakespeare. Indeed, the dramatists of the ages of Louis XIV and Louis XV did not understand Shakespeare and even regarded him as barbarous. Molière (1622–1673), the most famous writer of comedies in the days of Louis XIV, believed that comedy should depict contemporary men, thoughts, and actions as naturally as possible. The purpose of comedy was not only to amuse spectators but to instruct them at the same time, and the characters were drawn from the nobility, the *bourgeoisie*, and the lower classes. *The Misanthrope* portrays the court nobility. *The Shopkeeper Turned Gentleman* pictures corrupt noblemen. *The Imaginary Invalid* satirizes the members of the medical profession—and they richly deserved it. *Tartuffe* describes obsequious gentlemen ushers. *The Miser*, *The School for Women*, and *The Doctor in Spite of Himself* portray simple and naïve folk of the lower classes. Molière's comedies form a gallery in which we see the society of the seventeenth century as no other dramatist was able to portray it.

Tragedy also flourished and, like comedy, was severely simple in plot, closely following classical models. Pierre Corneille (1606–1684) is noted for his *Cid*, a play based upon the medieval Spanish patriot; he also produced *Polyceute*, *Andromeda*, and others based upon classical history and mythology. Corneille's stately characters are less vivacious and less real than those of Molière, largely because the latter drew his personages from concrete examples in everyday life, while the former's are moved by unnaturally lofty feelings and seem to declaim in a stilted manner. Jean Racine (1639–1699) likewise drew his themes from classical literature and wrote in a vein similar to Corneille's. His *Alexander*, *Phaedra*, and *Iphigenia* may be regarded as among his best. In general, Racine's heroic and tragic characters rise to sublime heights of human feeling and noble expression.

French Prose Literature. One of the further glories of the age of Louis XIV was its prose literature. Educated people of that time were particularly fond of classical Roman letters. The prose of Cicero and the verse of Vergil and Horace were widely imitated. This was inevitable, for everybody who went to school was drilled in Greek and Latin grammar, learned to write elegant Latin prose and verse, and committed to memory long passages from the ancient classics. The classical bias was well expressed by the literary arbiter of the period—Nicolas Boileau

(1636–1711). Born in Paris of an ancient bourgeois family that had often served the crown, and appointed royal historiographer, Boileau soon gained the title of "legislator of Parnassus." He wrote satires in imitation of Juvenal and Lucian, but his *Art of Poetry* is perhaps the most significant of his writings. He argued that good style is characterized by four fundamental characteristics, nature, truth, beauty, and reason—all completely represented in the masterpieces of Greece and Rome. What has been regarded as beautiful at all times and all places constitutes the basic aesthetic philosophy of literature. In ancient times, this had been expressed by Homer, Sophocles, Vergil, and Horace. Great literature, in the opinion of Boileau, should share in these traditional aesthetic conceptions. Thenceforth, this doctrine was widely accepted, and Boileau exercised much influence upon such men as the English poet John Dryden. The *Art of Poetry* inspired Alexander Pope to write his *Rape of the Lock*. Boileau became the lawmaker of the "classical age" of French and other European literature, and his conceptions were dominant until the Romantic movement of the late eighteenth century.

While Boileau was thus interpreting the aesthetic feelings of educated Frenchmen, other writers were producing works that made their names known throughout the world. François de La Rochefoucauld (1613–1680), a nobleman, courtier, and soldier, is the author of the immortal *Moral Maxims*, 700 short compositions written in trenchant style and often containing only a few lines. "He has packed the *Maxims* so full of meaning that it would be impossible to pack them closer, yet there is no undue compression" is the verdict of an admiring critic. A man of wide experience who knew the corrupt noble society of his day, he believed that human action sprang from self-interest. Jean La Fontaine (1621–1695), author of *Contes*, or *Tales*, in verse—resembling stories by Boccaccio and similar writers—possessed a marvelous faculty for telling a tale in simple language. While his stories often deal with questionable matters, he never indulged in grossness. His style is always polished, his manner gentlemanly, even when he is telling a risqué tale. His *Fables* also are famous, revealing an even greater artistic talent. It is a tribute to his versatility that children like the *Fables* because they are delightful stories, students of literature admire them because they are models of narrative verse, and mature people enjoy them because they contain penetrating reflections on the character of men. Marie de Sévigné (1626–1696), the greatest letter writer of the age, possessed an observant eye and a ready pen. Her vivacious *Letters* present sympathetic and accurate pictures of the morals and manners of her day. Jean de La Bruyère (1645–1696) was an essayist and moralist. His *Characters* consist of brief essays in which he attacked important and would-be important

people. Although he owed much to Montaigne, his spirit was more akin to that of Lucian and his pointed language reminds us of the satires of Pope. Nevertheless, the portraits in La Bruyère's *Characters* are original creations, unequaled by any other writer.

French Religious and Philosophical Writers. The age of Louis XIV also produced writers on religious and philosophical themes. Although the Reformation had brought much trouble to France, the country had largely remained Catholic. The crown since 1516 had named archbishops, bishops, abbots, and important canons, and the Pope had readily approved the nominations. The higher clergy in France assumed more and more a political importance. Such political appointees were often absentee churchmen, a serious abuse. Nevertheless, many of the clergy who owed their appointment to the king were good churchmen. Jacques Bossuet (1627–1704), Archbishop of Meaux, was a great writer, remarkable theologian, and effective pulpit orator who preached on numerous state occasions. He wrote treatises in defense of religion but also used his pen in supporting the political and religious organizations of his day. He taught that the establishment of Christianity was the most important event in the history of the world and that the church, founded by Christ, was the official guide and interpreter of all religious life. In secular matters, men were to be governed by kings, who, Bossuet held, were appointed by God. Consequently, rebellion against kings was a rebellion against God. He frankly accepted this close connection between church and crown, without seeing the dangers such relationship might bring to church and religion.

François Fénelon (1651–1715), a follower of Bossuet, was probably the most striking political churchman under Louis XIV. He became tutor in the royal household and archbishop of Cambrai. Like Bossuet, he interested himself in many things, produced treatises on philosophy and religion, and was especially concerned with education. He wrote a *Treatise on the Education of Girls* in which he expressed advanced views, even proposing that an educated woman was likely to be a better housewife and mother than one who was not educated. He held that mothers should take charge of their daughters' education and not leave this task to less interested persons. As tutor of the brilliant young duke of Burgundy, Fénelon had a unique opportunity to test his ideas. But the youth was passionate and unstable, and Fénelon was unable to do much for him. Out of this relationship, however, came Fénelon's *Télémaque*, a novel in which political matters were treated in a utopian manner. Kings were represented as ruling in the interests of their subjects. Subjects were not created to be exploited, as Louis XIV seemed to believe. Wars were denounced as great evils, and the belief

was expressed that nations should live in fraternal unity. These fervent ideas were really a criticism of Louis XIV's methods of government and his eagerness for war.

The quiet of religious life under Louis XIV was broken by the Jansenist quarrel. Jansen (1585–1638) was a Netherlander who studied at the University of Louvain, where he became deeply interested in St. Augustine; in later life, he wrote the important book *Augustinus*. He stressed man's dependence upon God as against the ancient Catholic view that man is endowed with free will. He disliked the theology of the day, maintaining that it was too complicated and possessed little meaning for the average man or woman and that people found their religious comfort in simple devotions, not in elaborate ritual. He objected to ceremonialism and, stressing man's helplessness and dependence on his Maker, emphasized personal religious experience and conversion. Jansenism soon began to attract attention in France, especially at Port Royal, an ancient Cistercian abbey near Paris. One reason for the popularity of Jansenist ideas was that zealous religious individuals were discontented with the half-political character of the church. Jansenist emphasis upon man's direct relationship to God, which implied predestination and made priestly ministration useless, seemed to fill the needs of many but was hotly opposed by the Jesuits.

Blaise Pascal (1623–1662), the noted scientist, took an active interest in the heated controversy that ensued, as he did, being deeply religious, in all the religious questions of the day. He wrote the *Provincial Letters*, satires filled with polite irony and written in such perfect style that subsequent generations have admired their incomparable lucidity. In his *Pensées*, or *Thoughts*, which deal with the Christian faith, Pascal discussed such topics as the reasonableness of religion, its truth, and its attractions and revealed a profound understanding of the mysteries of Christianity.

The great merit of the prose as well as the drama of the age of Louis XIV is its clarity and simplicity—notable virtues in any literature, for people are not likely to read books written in a heavy or an obscure style. The great writers of this period not only gave France a magnificent literary form but made French literature the most significant of any in Europe. All persons—Spaniards, Netherlanders, Germans, Englishmen, Russians, and Italians—who pretended to learning read French authors.

Louis XIV Furniture. The development of the Louis XIV style of furniture is a remarkable feature of the culture of the age. Although the elaborate designs characteristic of the Italian furniture of the Baroque Age were copied, French furniture makers, like French painters and architects, disliked extremes; hence, French furniture of this period is comparatively simple and refined. Cupboards were made in great

numbers, their doors carved with geometrical designs. Tables had heavy legs decorated with elaborate carving. Chairs were of various kinds and usually had turned baluster legs. Upholstery was of brocade or velvet. As the reign wore on, decorative design became delicate and elaborate. Such are a few of the characteristics of the furniture of the age of Louis XIV when France "became, as in many another thing, the foremost nation of Europe in the art of beautifying the homes of human beings."

GERMANY. Beyond the borders of France there was almost universal admiration for the taste and refinement exhibited at the court of Louis XIV and people zealously strove to emulate it. In Germany, however, it was a different story. That country suffered severely from the violence of the Thirty Years' War (1618–1648). Its prosperity was almost ruined, cities shrunk to the size of villages, population decreased, and everywhere were signs of economic and social decline, with little opportunity or ability to enjoy the finer things of life. An outstanding literary work is *Simplicissimus* by von Grimmelshausen (1625–1676), which reveals all the excesses of this period, its moral degradation, and the ruin of higher culture. During the years in which Louis XIV ruled in France, Germany therefore contributed little to European civilization although the courts of its many princes made some effort to ape the manners of the French. That of Brandenburg, or Prussia, was the most successful in giving some direction to the life of its people. Its Elector Frederick William, who ruled from 1640 to 1688, maintained a provincial court at Berlin. Although he took a paternal interest in the well-being of his subjects and worked hard to promote their economic and commercial welfare, higher culture had little opportunity to develop.

ENGLISH RELIGIOUS AND POLITICAL DISSENSIONS. During the age of Louis XIV, England was troubled by grave religious and political dissensions. The ancient Catholic church had been supplanted by another known as the Anglican church or Church of England. It took its definite form under Queen Elizabeth and remained the state faith of the English people, every other church organization being discouraged. The Anglican church retained some Catholic teachings and practices, but it also adopted Protestant conceptions, and many Englishmen found this compromise arrangement unsatisfactory. Catholics who remained true to their faith courted jail sentences and possible martyrdom when they challenged the authority of the Anglican church. On the other hand, Protestants, known as Puritans, were equally dissatisfied and demanded that the church purge itself of its Catholic ways, thereby courting royal retribution because of their agitations.

Among these Protestant opponents were the followers of John Browne. They refused to belong to a church ruled by king and Parliament. Fear-

ing arrest, they fled and escaped to the United Netherlands, where they lived in the city of Leiden. They enjoyed the fullest religious freedom but, fearing absorption by the people among whom they lived, resolved to found a colony in America, where they might be free to practice their religion. Their voyage in the *Mayflower*, a famous episode in American history, resulted in their settlement (1620) at Plymouth, marking the founding of New England.

There were other discontented elements in the Church of England, for the purgative opinions of Calvin were shared by many. Scotland was Presbyterian, and Presbyterian influences came into England from that quarter. There were some Baptists—Calvinists who were influenced by the Mennonites of the Netherlands. Other sects were the Quakers, Congregationalists, Fifth Monarchy Men, Levelers, and Diggers. These groups, and also many Puritans commonly called "Dissenters," opposed a king who sought to dictate in religious matters. They argued that there should be no state control of religion, that the prince had no right to constrain people in respect to their religion, that the church should not be managed by bishops but by elders and deacons elected by the congregations, that if the king violated the natural rights of people, whether in religion or in politics, the people might revolt in order to preserve these rights, and that the king did not rule by divine right. Such opinions finally destroyed the absolutist regime that the kings were trying to establish in England throughout the seventeenth century.

The Great Rebellion (1642–1649) was a struggle over the question of the political character of the church of England and of the relation of the king to the government. During this conflict the Dissenters rose to power under their leader Oliver Cromwell. King Charles I who ruled from 1625 to 1649, was executed; and England became a republic called the Commonwealth, which lasted from 1649 to 1660. Oliver Cromwell served as Protector from 1653 until his death in 1658. During this period the various sects tried to secure religious freedom for themselves and to suppress Catholics and those who belonged to the church of England. There was so much turmoil and dissatisfaction that people finally grew tired of the constant changes in government and in 1660 restored the Stuart line of kings, which ruled until 1688. The Church of England was again made the official church of the people, but there was much tacit toleration.

Before 1649 the country had been governed by a king who asserted that he ruled by divine right and that he could veto any order of Parliament. Then came the Commonwealth, a kind of republic that tried to repress its theological enemies. The Restoration in 1660 might have meant a return to the absolutist ideas held before 1640 if Charles II, who ruled from 1660 to 1685, had been foolish enough to oppose the

Dissenters, as the Protestants were called collectively. But the king and his government were inclined to be tolerant. James II, king from 1685 to 1688, was a Catholic who apparently intended to reestablish the Catholic church and reaffirm his absolute authority over Parliament. The resulting reaction was the "Glorious Revolution" of 1688.

During these years, we meet with the first political parties in European history. The supporters of the king were called Tories. They were the gentry who owned estates. Among the king's opponents were the Whigs; they belonged to the rising merchant class in the towns, especially London. Many of them were Protestants who objected to the church of England and resisted every effort of the king to make himself absolute. They believed that the Parliament in which they were represented should control the policies of government and were bitter opponents of the theory that kings rule by divine right.

During this time also began to develop the cabinet system of government, which, with the party system, constitutes a most important contribution to modern political life. A cabinet is an executive committee composed of ministers—members of Parliament who are also members of the king's council. They direct the policy of the government and receive instructions from the majority in Parliament. They are responsible to Parliament; if they lose parliamentary support, they resign or appeal to the country in a new election. These tendencies triumphed in the Glorious Revolution of 1688, when James II lost his throne and Parliament appointed as his successors William and Mary. Absolutism in England now declined, the theory of government by divine right died, and party government, as expressed in the Cabinet, triumphed.

English Writers on Political Theory. An age so filled with war, dissension, and political experiment naturally produced writers on political theory. The first of these was Thomas Hobbes (1588–1679). Educated at Oxford, he became a tutor in the family of a nobleman, traveled extensively, and was deeply impressed by the thought of Montaigne, Galileo, and Descartes. Like the latter, he believed that nature was a vast machine but denied that there was any dualism of matter and mind. He held that only matter and motion existed and tried to explain mind from these two phenomena. Hence, Hobbes was a thoroughgoing materialist, a skeptic so far as religion, philosophy, and traditional ideas were concerned. When he discussed political theory in his famous *Leviathan* (1651), he discarded old principles drawn from the Bible, scholastic philosophy, religion, and simple morality. He even abandoned the idea of natural law and natural rights. Believing, however, that absolute monarchy was the best form of government yet devised, he evolved the following theories: Man naturally is an unsocial creature led by selfish motives, instinctively hostile to all his fellows. In the

beginning, before state and society had made their appearance, men were constantly at war with each other. To put a stop to this ruinous state of affairs men had come together and formed a "social contract" with their ruler. By this contract, absolute monarchical power was established whereby men have since been governed. Any attempt to overturn the prince's government, therefore, is unthinkable as the prince has full control over religion, individual conscience, and legislation. Hobbes's political theory became popular with Englishmen who believed that the king's power should be exalted above that of the state.

The political thought of John Locke (1632–1704) was of a different nature. As his philosophy will be discussed in Chap. XL, only his ideas about government will be mentioned here. These theories were presented in *Two Treatises of Government.* Just as Hobbes defended absolute government, so Locke upheld the Glorious Revolution of 1688. He believed that all men possess certain natural rights, that is, those of life, liberty, and property, and argued that people call government into existence simply in order to protect their natural rights. Should the government fail to protect its subjects, the latter possess the right to overthrow it and establish another better suited to their needs. Sovereignty lies with the people, not with the monarch and his government. Since the people are merely a collection of individuals, political decisions rest with the majority. As it is the government's duty to protect the liberties of the people, the state has no right to meddle with religion or to punish people for their religious opinions, unless they are Catholics. These ideas found favor among the middle-class property owners of England, who were eager to control the king and dictate financial policies. Furthermore, many of this class, being Dissenters, welcomed Locke's ideas about religious toleration to bolster their own position.

English Literature. Men who lived through the changes in politics and religion described above must have felt many conflicts. Some were rigid Protestants like John Bunyan (1628–1688), who wrote *The Pilgrim's Progress,* a religious allegory in which he depicts the progress of the soul to its eternal home. John Milton (1608–1674), a Protestant thoroughly trained in Greek and Latin literature, wrote beautiful sonnets, Latin poetry, and short poems such as *Il Penseroso, L'Allegro,* and *Lycidas.* His *Paradise Lost* and *Paradise Regained* are long poems of stately form and exalted religious tone. Samuel Butler (1612–1680) was an excellent satirist who ridiculed the Presbyterians in a long poem called *Hudibras.* In this, Sir Hudibras sallies forth like a knight of former times, not to fight in a tournament, but to contend like a controversialist, making fun of Presbyterianism. The poem is full of trenchant descriptions such as the following, of a religious disputant:

He was in logic a great critic,
Profoundly skilled in analytic:
He could distinguish, and divide
A hair 'twixt south and south-west side;
On either which he would dispute,
Confute, change hands, and still confute;
He'd undertake to prove, by force
Of argument, a man's no horse;
He'd prove a buzzard is no fowl,
And that a lord may be an owl:
A calf an alderman, a goose a justice,
And rooks committee-men and trustees.

John Dryden (1631–1700) began life as a Puritan, became a Royalist after 1660, and turned Catholic under James II. These changes of conviction laid him open to the charge of currying favor for a pension. But, in spite of his shifts in position, his political satires are important. *The Hind and the Panther* deals with the Catholic church (the hind) and its enemy, the Church of England (the panther). Before this he had written *Religio laici*, or *Religion of a Layman*, in which he defended the Church of England. *Absalom and Achitophel* is a satire directed against the Whigs. Dryden's great fame is due in part to the fact that his poetry well reflects the political and religious confusion of the age.

English Architecture. Native painting did not flourish in England in the age of Louis XIV; pictures were painted by foreigners like Anthony van Dyck of Antwerp or by artists who were influenced by Netherlandish masters. Nor did sculpture develop. But some notable work was done in architecture. Inigo Jones (1573–1631) studied in Italy and introduced a modified renaissance style to England that proved very popular. Sir Christopher Wren (1632–1723) continued in his footsteps. When the Great Fire of 1666 destroyed a large section of London including the cathedral of St. Paul's, Wren was employed to help lay out a new city. He built remarkable churches such as St. Mary-le-Bow and St. Bride's as well as the new St. Paul's, which still soars above the skyline. Wren's buildings, patterned after the prevailing baroque style of Italy, were simpler in structure and more sober and dignified in ornamentation and have elicited the admiration of succeeding generations.

Russia. During the age of Louis XIV a profound change began to take place in Russia. Long a backward region, far removed from the lanes of commerce that had made Portugal, the Netherlands, England, and other lands of western Europe wealthy, Russia played but a slight part in the development of European civilization. Its numerous petty nobility autocratically ruled a land of peasants. Towns were few and small, the chief ones being Kiev and Moscow. There was almost no

commerce, and a Russian town-dwelling class did not exist. The manners of the people were crude; science, learning, and other features of Western civilization were unknown. This suddenly began to change, owing to the energy and genius of the youthful czar, Peter the Great, who ruled from 1689 to 1725.

Peter was one of the most remarkable rulers of all time. As a boy, he became interested in the foreigners he met in Moscow, among whom were a Swiss, a Scot, a Netherlander, and some German merchants inhabiting a small suburb. From these people Peter heard about the marvelous progress of the Netherlands, France, and Prussia. He learned to manage a sailboat and acquired an understanding of commerce and industry. Soon this despotic czar of a purely agricultural country, with a culture ages removed from that of more advanced lands, proceeded to introduce the advanced town culture of western Europe into Russia.

As soon as possible, Peter went on a tour to see with his own eyes all that was important in western Europe. Few journeys have been so significant. He visited the Netherlands, a country amazingly rich because of its industry, shipping, and commerce. What a contrast this little country must have presented to his eyes accustomed to nothing but the forests and plains of Russia! He went to Zaandam, where he worked with his own hands at shipbuilding, to Amsterdam, where he worked on the docks of the East India Company and saw great ships from the Indies laden with articles of luxury. He witnessed a naval display in England. In Paris, he saw the splendors of the art, social customs, and other features of the court of Louis XV. Visiting Prussia, he was impressed by the skill and efficiency of the army.

With prodigious enthusiasm, Peter began to introduce some of these features. He reformed the army that he might drive the Turks and Swedes out of Russia. Had he not seen how a state grew wealthy from trade by sea? He wanted access to the Sea of Azov on the south and to the Baltic Sea on the north. As soon as he had defeated the Swedes, he built St. Petersburg on the Neva River. Introducing Western dress, ideas, manners, and art, he tried to rule like a Western king. Thus Russia opened her windows to the West and abandoned her attachment to Siberian and semioriental ways. Many elements of western European civilization now passed into eastern Europe. Russian culture henceforth becomes increasingly a part of the European cultural complex.

Although in many respects brilliant and creative, the culture of the Baroque Age possessed grave defects. First, the controlling forces in the society of the period were absolute rulers, nobles, and such of the townsmen as were disposed to ape the manners of the French court. Wealth was increasing; but the directing forces of society contributed only slightly to the economic prosperity. The social and political chasm

between noble and non-noble increased constantly; the distant day of reckoning—to be realized in the French Revolution—was dawning. Further, the absolute Louis XIV, blessed with great wealth and enjoying complete control over France, failed to keep the peace. Launching four costly wars, he placed financial burdens upon his people, which ultimately discredited his monarchy and brought ruin to its parasitic, aristocratic life and culture.

FOR FURTHER READING

BAIRD, H. M.: *The Huguenots and the Revocation of the Edict of Nantes*
BELL, W. C.: *The Great Fire of London*
———: *The Great Plague in London in* 1665
BELLOC, HILAIRE: *Richelieu: A Study*
BERTRAND, LOUIS: *Louis,* XIV
BOULENGER, JACQUES: *The Seventeenth Century*
CHEVALIER, JACQUES: *Pascal*
CLARK, G. N.: *The Seventeenth Century*
FARMER, JAMES: *Versailles and the Court under Louis* XIV
HASSAL, ARTHUR: *Mazarin*
———: *Louis* XIV *and the Zenith of the French Monarchy*
HUGON, CÉCILE: *Social France in the* XVII *Century*
HUTTON, W. H.: *The English Church from the Ascent of Charles* I *to the Death of Anne,* 1625–1714
MACAULAY, T. B.: *History of England,* Vol. I
OGG, DAVID: *Europe in the Seventeenth Century*
PERKINS, J. B.: *France under Mazarin*
———: *Richelieu and the Growth of French Power*
PIJOAN, JOSEPH: *History of Art,* Vol. III
TORNIUS, VALERIAN: *The Salon, Its Rise and Fall*
WAKEMAN, H. O.: *Europe,* 1598–1715

Chapter XXXVIII

BEGINNINGS OF THE INDUSTRIAL REVOLUTION

Ancient traditions, when tested by the severe processes of modern civilization, commonly enough fade away into mere dreams; but it is singular how often the dream turns out to have been a half-waking one, presaging a reality.—T. H. Huxley

IT NOW becomes our task to describe a most significant change in modern history—the revolution in commerce and industry that began in England during the seventeenth and eighteenth centuries. After 1800, this revolution spread to the United States and to the continent of Europe, where it brought in its trail social and economic changes fraught with the profoundest implications. Historians refer to these changes as the "Industrial Revolution."

Factors that modify culture are not always political and military. Historical scholars have come to realize that, important as the work of a Napoleon or a Wellington may be, the labors of a Watt or a Stephenson are more profound, more far-reaching in effect. The achievements of Napoleon as a soldier, legislator, and statesman will long be felt; but the invention of the steam engine by James Watt will in all probability affect more people and appear more important in the estimation of future generations.

Causes of the Industrial Revolution. What were the causes of the Industrial Revolution? So many factors are involved that it is difficult to give a simple answer. First should be noted the profound change in English economic life after the discovery of America and the opening of a sea route to India by way of the Cape of Good Hope. Yet, situated on the outer rim of Europe, England had enjoyed only a comparatively modest economic prosperity. But when the Atlantic seaboard of Europe became the western terminus of a busy trade in luxuries with the Far East, England rapidly increased her economic well-being.

The staking out of a vast colonial empire on the North American continent was another factor. The London Company founded Jamestown in Virginia (1607), the Massachusetts Bay Company established Boston (1630), and the Pilgrim Fathers founded Plymouth (1620). Gradually, from 1607 to 1732, English colonies were established along the Atlantic seaboard from Maine to Georgia until there were thirteen in all, their western limits extending to the Blue Ridge and Allegheny Mountains.

As these colonies grew steadily, the English merchants sought to secure for themselves a monopoly of the trade. The English government was mercantilist, in sympathy with the custom universal among countries of the day. The navigation acts beginning with 1651 required that colonies export raw products to the mother country in English ships and import manufactured articles also in English bottoms; and the merchants of England derived handsome profits from this trade.

The Dutch, having forestalled the Portuguese and English in the East Indies, were able to maintain their commercial ascendancy. But they had also established a colony in New Netherland, where the navigation acts caused bitter feeling between the Dutch and the English. The Dutch, as the chief commercial carriers of the day, bitterly opposed the navigation acts; and the outcome was a series of Anglo-Dutch wars in 1652–1654, 1665–1667, and 1672–1674. During the course of these struggles the English gained possession of the Dutch colony of New Netherland, which then became New York.

Even more significant to us were the colonial rivalries with France. The French had founded Quebec in 1608 in the St. Lawrence River Valley and established a series of forts holding the strategic portages from Fort Duquesne at the junction of the Ohio and Monongahela rivers southward to New Orleans, thus blocking every chance for the English along the Atlantic seaboard to expand into the Ohio and Mississippi valleys. The War of the Spanish Succession (1700–1713), that of the Austrian Succession (1740–1748), and the French and Indian War (1756–1763) resulted in the defeat of France and the loss of her colonies in North America, save the region west of the Mississippi known as Louisiana. These events determined that the new American lands, still largely uninhabited by white men, were to become English and not French in culture. India also was taken from the French during the French and Indian War, and its teeming population thenceforth provided markets for English goods. Thus were the economic and territorial foundations of the British Empire securely laid by these colonial and military ventures.

Creation of the commercial empires of the United Netherlands and England proved lucrative for both merchants and manufacturers. And as prosperity increased, the population of these and other European lands grew steadily. Trade in sugar developed rapidly, for as the material scale of living rose this commodity became a necessity even for the lower classes. During medieval times, honey had been the chief means of sweetening foods; apiaries were common on manors, but the supply of honey did not keep pace with the increase of population during the last three centuries of the Middle Ages. The Arabs, acquiring the secret of making sugar from sugar cane when they conquered the Tigris-

Euphrates Valley and Persian lands to the east, brought the sugar cane to Europe and with it the process of making sugar. A considerable amount of sugar was produced in Arabic Spain, whence it was exported to other parts of Europe. But the supply of sugar never was large, and its price, like that of honey, remained so high that only the wealthy could afford it.

Spaniards brought the sugar cane to America, where it throve readily in the more tropical parts of the New World. Soon the West Indies assumed leadership in the production of sugar, which was imported into Europe. English merchants followed the Spanish example when during the seventeenth and eighteenth centuries they gained Jamaica and other West Indian islands and acquired a virtual monopoly of commerce in sugar. This monopoly was not disturbed until the opening of the nineteenth century, when Napoleon encouraged the extraction of sugar from the sugar beet and established the industry on a firm basis by forbidding the importation of cane sugar. The English made much money from cane sugar, but not so much as the merchants of Amsterdam derived from the spice trade.

Tobacco likewise became a necessity to an ever-increasing number of people in western Europe. This plant was a native of America, where the aborigines smoked and chewed it and made snuff from it. Believing that it possessed medicinal properties, they used it on solemn occasions and at religious ceremonies. The tobacco plant was carried to Spain during the first years of the reign of Philip II, and it spread rapidly to other parts of Europe. Jean Nicot, a French ambassador to the court of Portugal, sent the seeds of the tobacco plant to France, where it became known as *nicotaine*. For a time, Europeans, like the American aborigines, believed that the tobacco plant possessed curative powers and referred to it as *herba panacea* and "divine tobacco." Gradually, smoking spread throughout Europe, especially among the middle classes after the example set by Governor Ralph Lane of Virginia and Sir Francis Drake about 1586. English merchants enjoyed a monopoly of the lucrative trade in fine tobaccos produced in Virginia and other American colonies.

Trade in slaves also became a source of great profit. English merchantmen sailed regularly to the Guinea coast of Africa, seized large numbers of slaves, transported them across the Atlantic, and sold them to the Spanish or the English planters. However, the English were not the only people who indulged in this reprehensible commerce. Slavery had existed throughout medieval times, chiefly in Mohammedan lands. A slave-trading industry had sprung up in Africa and adjoining lands of Asia, particularly Arabia. Negro natives of the Guinea coast and central parts of Africa also kept negro slaves and carried on a busy

traffic in human beings. Spaniards and Portuguese began an active hunt for slaves when it was found that negroes were better workers than the American aborigines, who refused to cooperate with their white conquerors. The English merchants merely followed the example of earlier slave traders, and slavery became an accepted institution in the economic life of western Europe. This shocking inhumanity was possible because Europeans regarded negroes as inferior beings. Possessing a totally different culture, negroes could not be understood in an age when the first beginnings of anthropological study had not yet been made. In the estimation of slave traders, profits amply justified the trade. Having discharged their human cargoes, merchants loaded their ships with tobacco, sugar, rum, and molasses and returned to England. Other merchantmen sailed with manufactured goods directly from English ports to America and returned with cargoes of tobacco.

The fur trade was another source of riches. From time immemorial, furs had been an important article of clothing, especially in northern Europe. Medieval castles and houses were cold and, from the modern American standpoint, most uncomfortable. The habit of wearing fur-lined clothing was a common one. Jan van Eyck's painting of John Arnolfini and his wife shows the husband wearing a fur hat that in all probability was of the same type as the "Flaundrish bever hat" worn by the merchant in Chaucer's *Prologue*. Rembrandt, too, has portrayed a Polish nobleman dressed in furs.

When the Americas were discovered, it became known that the new lands abounded in fur-bearing animals. Fur was the first article produced in the parts of America north of Mexico that could be exported profitably to European markets. The Dutch, who settled the city of New Amsterdam, or New York as it is called today, traded for furs with the Iroquois confederacy, a group of Indians occupying the central part of the present state of New York, who acted as commercial intermediaries between the regions of the Great Lakes to the west and the Dutch at the mouth of the Hudson River. The English Hudson's Bay Company was chartered in 1670 to trade in America. This company at first made little progress because the French were occupying Canada, the Great Lakes region, and the Mississippi River Valley. After the French were forced to surrender Canada and other North American lands by the treaty of 1763, the Hudson's Bay Company became an energetic trading organization. It penetrated the Canadian wilds, crossed the plains of the Middle West, and during the early part of the nineteenth century exploited the fur trade north of the Columbia River. This company had a board of directors, residing in London, whose enterprising management fostered the fur trade and even today operates a large number of stores in Canada.

Other new products such as coffee came into Europe from the Orient, almost entirely through Dutch commercial channels. Although the beginnings of the use of coffee are shrouded in obscurity, it appears that it was first used as a beverage in Abyssinia, but how long it had been in use before it became known in Mohammedan lands it is impossible to tell. Mohammedans at first had some objections to its use, as liquors were forbidden in the Koran. Nevertheless, its use slowly spread among the Arabs until, by 1500, it had become a common beverage in Egypt and other places in the Near East.

It is remarkable that the use of coffee for a long time did not pass to other lands that traded constantly with Egypt and western Asia. The first coffeehouse in Europe was opened in Constantinople, the second in Venice; but the custom of gathering for coffee drinking in such houses did not become widespread until the seventeenth century. Coffeehouses then became popular centers where people discussed all sorts of questions. Princes sometimes disliked coffee houses because of the critical talk to be heard in them, and in England an effort was made by the government to suppress them.

Trade in coffee proved lucrative. Mocha coffee, produced in Yemen, was introduced by the Dutch merchants into Java, which soon became an important center of production. The Dutch also started coffee production in Guiana in South America, whence it passed into Colombia and Brazil.

For centuries, tea had been a favorite drink with the Chinese. Like coffee, tea seems to have a venerable antiquity, being used as a beverage as early as the sixth century A.D. It seems remarkable, therefore, that the custom of drinking tea remained completely unknown among Europeans during the Middle Ages. The Portuguese first became acquainted with it shortly after Vasco da Gama sailed to India. Then the Dutch traders learned the habit of drinking tea from the Chinese with whom they came in contact and introduced tea drinking into Europe. As they possessed a monopoly of the tea trade, they made handsome profits. Although produced in Java, tea remained a scarce commodity and hence was costly, selling for as much as $50 a pound. Tea was served in the coffeehouses, and chocolate also, a new beverage that became popular in Europe during the sixteenth century. The Spaniards introduced chocolate into Europe after their contact with the Aztecs, who consumed great quantities of cocoa. During the early years of the seventeenth century, it was commonly used in Dutch towns and by the eighteenth century had become a fashionable beverage throughout western Europe.

Development of Factories. The phenomenal commercial prosperity described above stimulated the growth of urban population in western Europe. It also encouraged rapid changes in the manufacture

of cloth, which are important to grasp because they explain how medieval industrial methods evolved into the modern. Three stages are to be noted. (1) In the medieval guild system the worker owned both materials and tools. This meant small-scale production by a large number of manufacturers. (2) This method changed during the closing Middle Ages, when capitalist clothiers bought the raw materials and parceled them out to workers who owned their tools. Thus grew up the "domestic" system, which broke down the ancient guild methods, for it subordinated entire crafts to the activities of capitalist entrepreneurs. (3) In the sixteenth century, a further transformation took place when factories began to develop, a departure that was to become immensely significant during the Industrial Revolution of the eighteenth century. Such a factory was owned by John Winchcombe of Newbury (*d.* 1520), or "Jack of Newbury" as he is popularly known in England. Its essential features are described in the following poem:

Within one room being large and long
There stood two hundred looms full strong:
Two hundred men the truth is so
Wrought in these looms all in a row.
By every one a pretty boy
Sate making quills with mickle joy.
And in another place hard by,
An hundred women merrily
Were carding hard with joyful cheer
Who singing sate with voices clear.
And in a chamber close beside,
Two hundred maidens did abide,
In petticoats of Stammell red,
And milk-white kerchers on their head . . . .
Those pretty maids did never lin
But in that place all day did spin . . . .
Then to another room came they
Where children were in poor array:
And everyone sate picking wool,
The finest from the coarse to cull . . . .
Within another place likewise
Full fifty proper men he spies,
And these were shearmen every one . . . .
And hard by them there did remain
Full fourscore rowers taking pain.
A dye-house likewise had he then,
Wherein he kept full forty men:
And likewise in his fulling mill
Full twenty persons kept he still.[1]

[1] Lipson, A., and C. Lipson, *The History of the Woollen and Worsted Industries.* pp. 46–47, A. & C. Black, Ltd., London.

Rise of Capitalism. From the foregoing, it is apparent that a remarkable economic change came over Europe during the sixteenth and seventeenth centuries. World trade and advanced methods of manufacture were producing unprecedented wealth; capitalism was becoming the most powerful economic force. As there is much misunderstanding today about the rise of capitalism, its history since the Middle Ages will be here briefly recapitulated for the sake of clarity. In Chapter XXIV, we discussed the rapid growth of trade and industry, beginning with the eleventh century, and its social consequences, reflected in the rise of towns. By 1400, there were more towns in western Europe than had ever existed under the Roman Empire, more people living in western Europe than lived in the same area in Roman days. Thus the true beginnings of capitalist economy are to be found in the medieval towns of Italy, the Netherlands, and other countries of western Europe, where capitalism made much progress during the sixteenth and seventeenth centuries. The opening of a sea route to India by way of the Cape of Good Hope was a great factor in its development. Another was the conquest of Mexico and Peru, which liberated vast quantities of precious metal stored up by the labor of generations of American aborigines. On the other hand, the religious changes of the Reformation did not greatly affect the growth of capitalism. Students of history, economics, and sociology should be on their guard against the popular current theory that Protestantism, especially Calvinism, created capitalism, for it has been shown to contain only a little truth.[1]

At the beginning of the Industrial Revolution, capitalism already had a long history. A great bulk of coined money was in circulation. Banks had come into existence in the Italian cities and Barcelona before 1500. During the seventeenth century the banking houses of Amsterdam occupied a commanding position in the business world. Stocks and bonds were actively traded, the Bourse of Amsterdam occupying the first place among competitors. Business houses, of which there were many, used the newly devised double-entry system of bookkeeping. Great trading corporations were founded, such as the Dutch East India Company, Hudson's Bay Company, and others already mentioned.

By reason of her colonial and commercial activity, England naturally shared in these business developments, and the changes entailed by the development of social and economic life on the Continent also appeared in England. Wealth increased rapidly, population grew steadily, and the country was filled with thriving businesses that enabled Englishmen to obtain a commanding position in the economic world.

[1] The reader will find the influence of Protestantism on economics discussed in the following books: Max Weber, *The Protestant Ethic and the Spirit of Capitalism;* H. M. Robertson, *The Rise of Economic Individualism;* Amintore Fanfani, *Catholicism, Protestantism, and Capitalism;* and Albert Hyma, *Christianity, Capitalism, and Communism.*

Revolution in Agricultural Methods and Cattle Raising. Great changes took place in agricultural and cattle-breeding methods during the seventeenth century. Charles Townshend (1674–1738), a country gentleman living in Norfolk, England, won fame for his efforts to improve farming. He found that turnips were valuable as food for cattle. So profitable was the raising of this vegetable that the enthusiastic Townshend could not resist talking about it continually and thus won the nickname of "Turnip Townshend." He also showed that the fertility of the soil is increased by the application of marl and emphasized the importance of clover in improving the soil. He probably derived his ideas from the Dutch, for these methods had been recognized for some time in the Netherlands. Not the least of Townshend's innovations was the so-called "four-course" system of cultivation, a consistent method of rotation. In the first year, according to this system, oats or wheat sown during the previous winter were raised; in the following year, oats or barley sown in the spring; in the third year, clover, vetches, rye, kale, and rutabagas for winter feed; in the next, the last year of the four-course system, turnips. Sheep were turned into the turnip patches where they grew fat and at the same time richly manured the ground, making it ready for a better crop of wheat in the following year. This method of cultivation also increased the amount and quality of such products as milk, meat, wool, and poultry.

From time immemorial, farmers had sown grain by hand, a difficult task, for the even broadcasting of seed was almost impossible and frequently more seed was sown than was necessary. Jethro Tull (1674–1741), a country gentleman who lived in Oxfordshire and Berkshire, England, developed a mechanical planter called a "drill" from the practice of "drilling" by farmers, that is, planting beans and peas by hand in furrows. Tull used his drill to plant clover. This machine was the forerunner of the highly efficient grain drill now used by farmers in sowing grain as well as clover and grass seed.

Tull was an observant person; on journeys through southern France between 1711 and 1714, he noticed that vine growers stirred the soil between rows of vines, a practice that increased the productivity of the soil by conserving moisture, thus making latent fertility available. Upon returning to his farm in Berkshire, he applied this idea to the raising of turnips. Gradually the practice of "horse hoeing," or "cultivating" as we call it today, spread over rural England, helped greatly by Tull's *Horse-hoeing Husbandry, Or an Essay on the Principle of Tillage and Vegetation*, published in 1733.

Tull also developed a new type of plow. The old type generally employed in Norfolk was mounted on two wheels and provided with a long iron knife, or colter. Turning the sod or fallow soil was possible

only when the ground was not covered with a rank growth of weeds. Often, however, the ground could not be turned completely, with the result that the weeds continued to grow. Tull's new device consisted of four colters instead of one, fastened in such a way that each colter cut a slice a few inches wide. This loosened the topsoil, cut roots and weeds, caused the ground to turn over perfectly, and helped to kill the roots. This plow, mounted on two wheels but with the beam lengthened in order to carry the additional colters, was the simple forerunner of our modern gang cultivators.

Cabbages and carrots now began to be raised extensively as field crops. Together with turnips, they produced succulent and nourishing food in large quantities, which tremendously stimulated dairying. Green manuring, by plowing under turnips, vastly increased the fertility of sandy soils and helped farmers raise more and better cattle. The manure of cattle also enhanced the productivity of the soil. Soon the new methods were revolutionizing agriculture through England.

Another important vegetable in the history of agriculture was the potato. Grown in large quantities in the Andes, it had become a chief article of diet among the Incas. Europeans became acquainted with it after the conquest of Peru and imported it into Italy, where it was grown abundantly, but only as fodder for pigs or as a curiosity. It is stated that Sir Walter Raleigh was the first to bring the potato into cultivation in England (1586), where it was used as an article of food by the wealthier Londoners during the seventeenth century. In Ireland, however, potatoes were raised so extensively that by 1676 they sold for as little as 1*s.* 6*d.* a bushel. In fact, it became the chief article of food among the Irish and therefore was called the "Irish" potato. Extensive raising of potatoes next appeared in Lancashire and gradually spread to other parts of England.

There seems to have been little or no prejudice in England against using potatoes as food. But it is quite otherwise on the continent, where it was believed that eating potatoes caused leprosy, no statements to the contrary prevailing against this superstition. Finally, Antoine Parmentier (1727–1813), a French apothecary, became convinced that the plant was not dangerous to health. Imprisoned in Prussia during the French and Indian War (1756–1763), he had eaten many potatoes and upon his release determined to popularize the potato as a foodstuff. Parmentier made a chemical analysis of the potato which showed that it could have no deleterious effects when used as food. Even the conservative medical faculty of the University of Paris reported favorably. Parmentier then approached the king, Louis XVI, who set aside a plot of land for experiment. The plants grew luxuriantly, and the king wore a potato blossom in his coat lapel, which silenced the incredulous mockers

among the courtiers. Soon people, driven by famine, were stealing potatoes from the patch. The battle was won, farmers began to plant more and more potatoes, and Parmentier became a benefactor of humanity.

Potato culture spread over northern Europe, particularly into the rich garden soils of the Netherlands, the lowlands of Saxony, and the drained swamps of Bradenburg. Produced in vast quantities, potatoes were cheap and became a new staff of life for the poor. It is safe to say that without the potato the rapid growth of European population after 1700 would not have been possible.

Robert Bakewell (1725–1795), who revolutionized methods of cattle breeding, was a farmer near Dishley Grange in Leicestershire, England. He began managing a large farm about 1755 and set out to improve the breeds of sheep and oxen. He believed it possible to increase the weight of animals. As proper feeding and breeding had never before been understood, cattle had remained small, providing little meat, and sheep produced poor fleeces. Bakewell developed a greatly improved variety of sheep, the Leicester, which weighed twice as much as common sheep. Common rams were hired for but a few shillings during a season, but Leicester rams brought as much as £25 (about $125). Soon Bakewell was making £3,000 (about $15,000) a year from his rams. One of them was so highly prized that its sale brought the unheard-of sum of £1,200 (about $6,000).

The enterprising Bakewell also turned his attention to breeding cattle and produced the Dishley breed, or Leicestershire longhorn. These cattle with compact bodies fattened readily. Bakewell also produced an improved breed of draft horses. He was an enthusiastic advocate of the use of barnyard manure and employed double floors in his stables to catch every drop of liquid manure that might fertilize his lands.

Bakewell appears to have been a gentle person, for he treated his animals with kindness, which was remarkable in that age of cruelty toward any helpless creature. He bestowed upon his animals the care and attention that men give to race horses. In this way, he shared in the rise of humanitarian sentiment, which was to assume great proportions before the close of the eighteenth century.

Charles Colling (1751–1836) was even more successful than Bakewell in producing cattle of quality. He improved the local breed of short-horns, and his farm near Darlington became an important center for cattle raising. His bulls Hubback and Favorite sired much prize stock. The great roan calf, sired by Favorite and known far and wide as the "Durham Ox," when 5½ years old weighed 3,024 pounds; when 10 years old, he weighed 3,600 pounds. As a show animal, the Durham Ox attracted much attention; after exhibiting him for 5 years, his owner

refused $10,000 for him. Colling's greatest animal, Comet, judged by all experts as the finest bull of the time, sold for the then fabulous sum of $5,000. In 1810, Colling sold at public auction his herd of forty-seven splendid cattle, realizing over $35,000, a greater price than cattle had ever been known to command.

These and other novel ideas about cattle raising were to have important consequences. Thomas Coke (1752–1842) of Holkham in Norfolk, England, experimented with the new methods of farming and gradually raised the income from his estates from £2,200 in 1776 to £20,000 in 1816. His practices were pithily expressed in the motto "No fodder, no beasts; no beasts, no manure; no manure, no crop." There is no greater farming wisdom. Coke also began holding annual meetings of farmers in his spacious house at Holkham. Agricultural problems were discussed and new methods investigated. His influence soon spread far and wide among the conservative farmers of the country.

Inclosures. Such new and improved methods of agriculture and cattle raising had a profound effect. Raising more and better crops and producing better cattle and sheep brought new money into circulation in rural communities. Ancient methods of tilling soil and the three-field system, both of which had come into existence during the early Middle Ages, were now clearly proved to be wasteful and impracticable. It was better to throw together the separate strips held by peasants and put common pastures and meadows under the plow; the whole, tilled according to the new methods, would show greater profit. This is called "inclosing" the common fields, a practice known as early as the fifteenth century. During the eighteenth century, particularly after 1750, the inclosure movement increased rapidly owing to the inability of ancient methods of agriculture and cattle raising to compete with the new.

In the process of inclosing an old estate with its common fields, common pastures, and common meadow, lords of manors frequently made arrangements with their peasants, buying their rights for cash or giving them small compact pieces of land to be owned by them as private property. To make the process legal, they secured bills in Parliament that authorized such inclosing. On paper, this seemed fair; in reality, it often produced hardships and misery. Peasants could not adapt their ways of working to the kind of tillage necessary on small parcels of land. Sometimes they received poor land that could not maintain families. Often, the capital the peasants had received for their rights was exhausted by their living expenses during the period in which they tried to adjust themselves. In this way, the inclosure movement produced a social condition that would have been disastrous had not the growing towns, and the factories in them, been able to absorb many of the peasants.

Scientific and Mechanical Invention. We have learned that man from the very beginning displayed great resourcefulness in providing himself with food, clothing, and shelter. Merely to list his numerous inventions would be an impossible task. Certain mechanical devices of the sixteenth and seventeenth centuries must receive some attention here, however. In medieval days, "engineering" meant the management

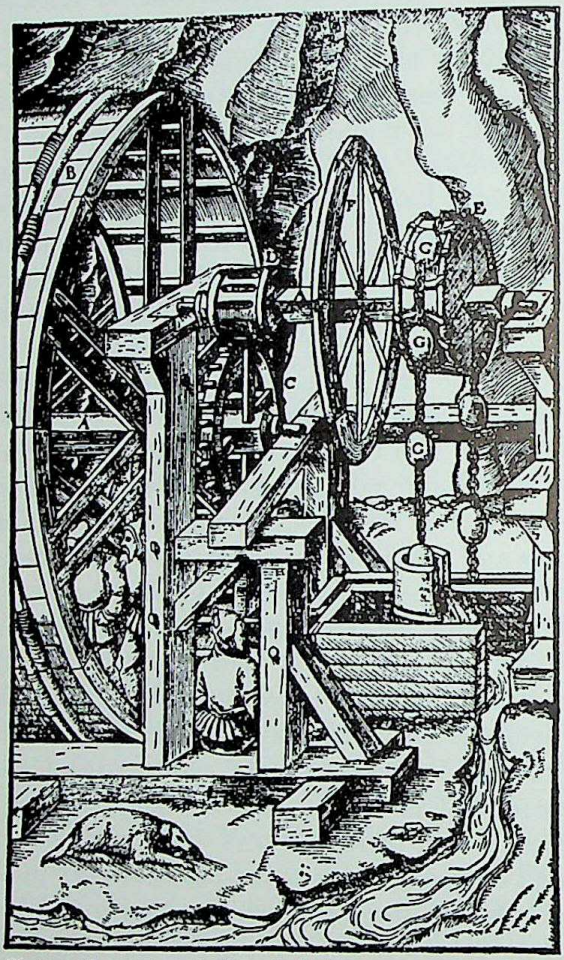


Fig. 105.—Sixteenth-century ball-and-chain pump operated by treadmill.

of engines such as water wheels and fulling devices. The term was used in a far narrower sense than today, when scientific knowledge has become so vast and the application of such knowledge so varied that we now have civil, electrical, chemical, sanitary, and other kinds of engineers. Mechanical engineering made noteworthy progress during the sixteenth and seventeenth centuries, owing principally to the mining industry. As European society developed and wealth became more extensive,

mining operations were increased. There was much demand for iron, gold, silver, copper, quicksilver (mercury), tin, zinc, coal, and lead. Many a mine went deeper and deeper into the earth, giving rise to such problems as hoisting and hauling ore, drawing off water that continually seeped into the lower levels, and ventilating the mines to provide them with fresh air and drive off poisonous gases. In the smaller mines, ores were hoisted by rope and bucket, operated by men. Sometimes a heavy flywheel was added to the machine, which gave greater lifting power. In deeper mines, ore was raised by power generated by large water wheels, some measuring as much as twenty feet in diameter. Such wheels turned shafts to which were fastened cogwheels, and these engaged other geared wheels running the hoisting devices. In the sixteenth century, such machines effectively lifted ore from the deepest mines.

Pumps are an ancient device of uncertain antiquity. Suction pumps were known in Greek and Roman times. The use of dippers attached to an endless chain operated by a windlass was common during the sixteenth century. This device was practical as long as mines were shallow; but as mines went deeper and deeper, suction pumps were useless since they cannot raise water more than thirty-two feet. An invention appeared at this time which facilitated the old methods of draining. This was the improved chain pump composed of a chain, with metal balls, that ran through a tube. By revolving the chain on a windlass, water was lifted in the tube. Another device was to place several suction pumps in stories one above another; each pump raised the water into a basin, from which it was lifted by the pump above it to the next basin, and so on. Such a series of pumps was operated by means of levers fastened to a crank attached to the shaft of a water wheel.

As mines became ever deeper and miners dug vast caverns and winding passageways, the problem of ventilation grew serious. Most mines were ventilated by fans turned by workmen, windmills, or water wheels. A great improvement was made when large bellows were hitched to water wheels. Bellows, it is interesting to note, are such ancient devices that no one knows who invented them. Egyptian craftsmen used them extensively. To smelt ore, medieval workmen at first used a hand bellows, an ineffective device too small to generate a current of air sufficiently great to liquefy large masses of metal. Hence, when the large bellows operated mechanically was invented, a revolution was effected in the art of working metals.

The problem of providing a constant supply of water for the population of ever-growing cities led to much experimentation. Unfortunately, few of the machines made for this purpose have survived, and descriptions of them usually are so vague that they fail to give us an accurate idea of what they were like. The hydraulic engines in Augsburg pumped

water into "towers." Three of these towers provided 1,000 houses with water. One tower, by means of a system of lead pipes, fed fountains in the public squares. The machines, which worked continuously, were constructed on the principle of Archimedes' screw. The lowest screw raised the water from the river into the basin above it. A series of such

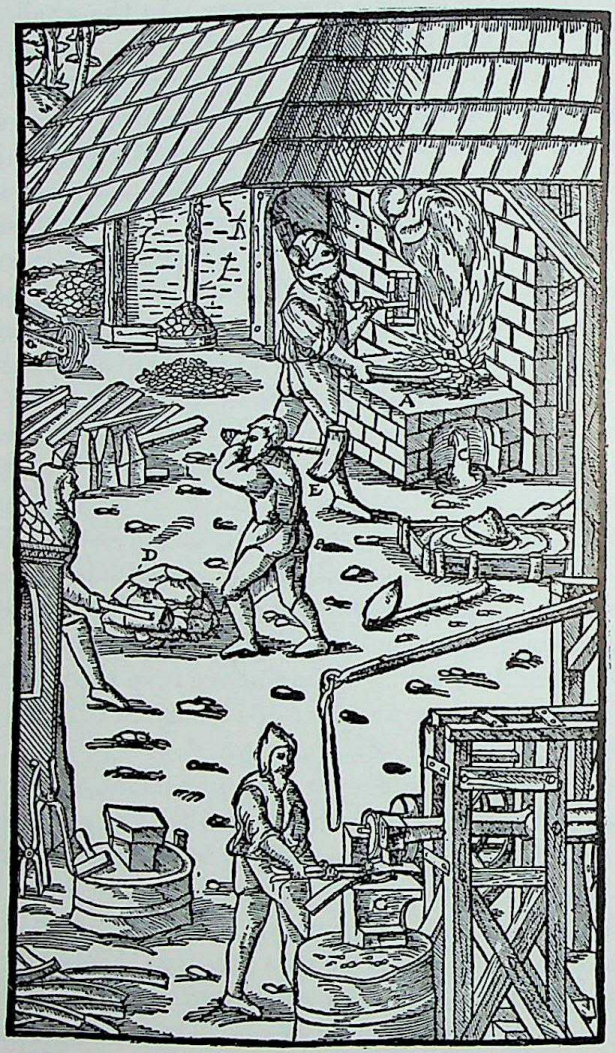


Fig. 106.—Woodcut, a sixteenth-century bloomery.

screws carried the water to a height of 130 feet. A machine to supply the alcazar in Toledo brought water from a distance of 2,000 feet and raised it about 250 feet. A similar machine was installed in London. Prior to 1582 its citizens had relied upon water drawn from wells or brought into the city by means of pipes. The water wheels of the new machines were stationed between the arches of the old London Bridge.

So successful was this pumping device that it remained in use until 1822. Ten great mains carried the water throughout the city. This machine pumped as much as four million gallons per day.

Mechanical progress was slow, however, as compared with present-day methods. This was inevitable, because men did not know how to make accurate tools, without which efficient machinery was impossible. The lathe is the chief tool needed in making shafts, gears, screws, and cranks. The history of lathes is uncertain; but it is known that the simple lathe, driven by a cord or catgut attached to the end of a pole and pulled by a treadle, was used in the sixteenth century. Many improvements were made until finally a variety of toolmaking machinery evolved. One of the first improvements was the use of a screw that could be adjusted so as to hold tightly pieces of wood or metal of varying size. The mandrel, a device that firmly held an object between two revolving points, also appeared during the sixteenth century. It enabled a workman to shape more accurately round pieces of varying design.

Gradually, machines were improved in both efficiency and accuracy. Many workers, for instance, had contributed toward making accurate clocks and watches. Finally, Christian Huygens (1629–1695) produced a pendulum clock (see also page 598). The pendulum was an important invention, for it accurately regulated the running of clocks. As exact timekeepers were necessary in all sorts of scientific work, the perfecting of clocks greatly influenced progress in scientific and mechanical invention.

FOR FURTHER READING

Buffington, A. H.: *The Second Hundred Years' War*, 1689–1815
Cheyney, E. P.: *Industrial and Social History of England*
Corti, E. C.: *A History of Smoking*
Dietz, F. C.: *The Industrial Revolution*
George, M. D.: *London Life in the* XVIII*th Century*
Gras, N. S. B.: *Industrial Evolution*
Heaton, Herbert: *Economic History of Europe*
Lipson, Ephraim: *The Economic History of England*, Vol. II
———: *The History of the Woolen and Worsted Industries*
Moffit, Louis: *England at the Eve of the Industrial Revolution*
Oakeshott, W. F.: *Commerce and Society: A Short History of Trade and Its Effect on Civilization*
Packard, L. B.: *The Commercial Revolution*
Quennell, Marjorie, and C. H. B. Quennell: *A History of Everyday Things in England. The Rise of Industrialism*, 1733–1851
Renard, G. F., and Georges Weulersse: *Life and Work in Modern Europe*
Soltau, R. H.: *An Outline of European Economic Development*
Usher, R. P.: *A History of Mechanical Inventions*

Chapter XXXIX

REVOLUTION IN INDUSTRIAL AND ECONOMIC LIFE

There rolls the deep where grew the tree.
O earth, what changes hast thou seen!
There where the long street roars hath been
The stillness of the central sea.

The hills are shadows, and they flow
From form to form, and nothing stands;
They melt like mist, the solid lands,
Like clouds they shape themselves and go.

—Alfred Tennyson

The Steam Engine. The inventions of the eighteenth century and the mechanization of industry, together with the social consequences entailed by them, constitute a thrilling story. The greatest of these

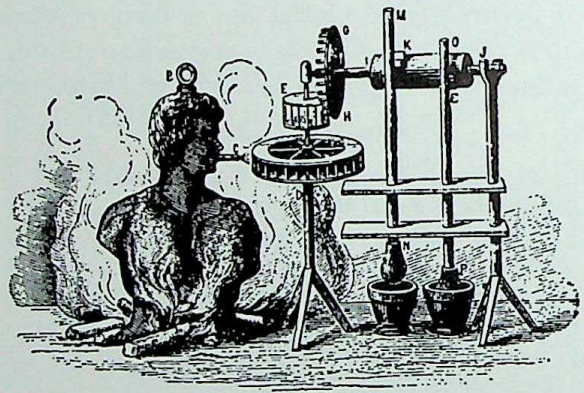


Fig. 107.—Giovanni Branca's model of a steam engine.

inventions is the steam engine. In the second century B.C., Hiero of Alexandria had created a device mounted between two metal points, which revolved by steam escaping from two vents; but this engine had no practical results.[1] Other inventors interested themselves in the properties of steam; but little progress was made until Edward Somerset

[1] It is instructive to note at this point the steam turbine projected by the Italian Giovanni Branca (1571–1645). Its purpose was to operate pestles pulverizing materials in mortars. It is not known whether such a machine was ever constructed. This device is interesting because it illustrates an idea repeatedly employed by inventors but with slight success, namely, an attempt to produce machinery imitating the actions of a human worker.

(1601–1667), Marquis of Worcester, began his experiments. In 1663, he produced a "water-commanding engine" used in raising water from deep mines. Steam was forced through pipes into cylinders, or steam chests, where the vacuum created was filled by water forced upward by atmospheric pressure. The steam chests worked alternatively, the flow of steam being controlled by valves worked by hand.

A great step forward was taken when in 1696 Thomas Newcomen (1663–1729), a blacksmith, invented an improved steam engine. Several inventors had experimented with pistons, but Newcomen was the first to use this device in an engine that worked efficiently. The accompanying figure shows its fundamental principles. The chest, or cylinder, was filled with steam from the boiler below it and controlled by a valve.

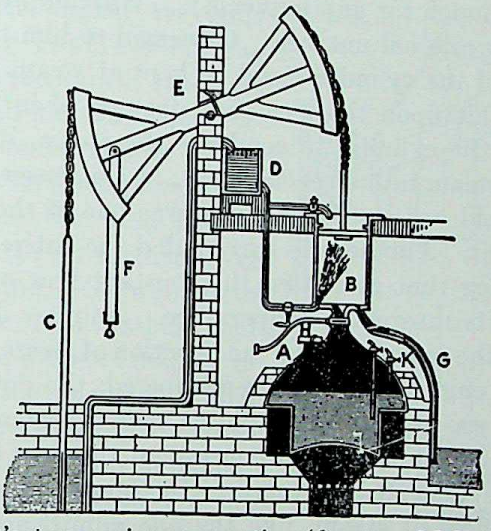


FIG. 108.—Newcomen's steam engine, cross section. (*Courtesy of John M. Wiley Company.*)

The piston was forced up, whereupon the beam tilted so that the rod which carried a bucket or operated a pump moved downward. The operator then turned the valve, which admitted a stream of cold water into the cylinder. The steam thereupon condensed, and a vacuum was created. Pressure of the air upon the piston forced the piston down, at the same time carrying the bucket or plunger of the pump, attached to the opposite end of the beam, upward. This engine proved efficient, for it pumped deep coal mines dry and saved miners from drowning. Newcomen's engines were used in England and the Netherlands as late as 1830.

Worcester's and Newcomen's engines have been described in some detail as it is important to trace the development of the steam engine, not merely because it is the most remarkable mechanical invention of modern times but because its gradual growth is typical of how mechanical

progress is made. But Newcomen's engine, efficient as it was, could still be improved upon. Its great defect was that time and energy were lost because the cylinder was cooled before the piston could be forced down after each stroke. How could this loss be eliminated? James Watt solved this problem and made other important improvements so that he is known as the "inventor" of the steam engine, in spite of the fact that much credit is due to Worcester and Newcomen.

James Watt. James Watt (1736–1819) was born of Scottish parents. A practical instrument maker who learned his craft as an apprentice, he never studied at a university. In 1757 the University of Glasgow appointed him its official mathematical instrument maker, a fortunate appointment, for it made possible the perfection of the steam engine, which is glory enough for any university. Watt improved Newcomen's engine in a truly original manner. It seemed to him that much energy might be saved if the cylinder could be kept at steam heat at all times. He accordingly hit upon the idea that, instead of introducing a jet of cold water into the cylinder to condense the steam, it would be better to draw off the steam into a special chest, or condenser, to be condensed by a spray of cold water. This device was one of the most original of Watt's inventions. Further, he surrounded the entire cylinder with an extra metal casing that permitted the constant flow of steam and kept the cylinder at its maximum temperature. Another departure was the forcing down of the pistonhead by the injection of steam above the piston. In Newcomen's engine, it will be remembered, the downward thrust of the pistonhead was due to atmospheric pressure above it. Watt also devised an automatic method of controlling the flow of steam into the cylinder by a clever system of valves. In Newcomen's engine the valve controlling the flow of steam, like the one admitting the jet of water into the cylinder, was operated by hand; but Watt's valves worked automatically.

Watt's invention, patented in 1769, was called a "single-acting" engine because the steam was used only to force the pistonhead downward. When it reached the bottom of the cylinder, the heavy pump rod at the end of the beam opposite the piston end drew the pistonhead up to the top of the cylinder. In Watt's single-acting engine, therefore, steam did the work done by gravity in Newcomen's engine, and gravity did the work done by steam. This was a great improvement, for it increased the efficiency of the engine by conserving heat. But reliance upon gravity for the upward movement of the pistonhead proved unsatisfactory, for it meant that the engine worked only half the time. Watt therefore made another improvement and in 1783 invented the "double-acting" engine. He contrived to admit the steam alternately above the pistonhead to force it down and below to force it up. The lower part

of the cylinder as well as the upper was now connected with the condenser, and both connections were controlled by valves.

The double-acting engine was far more efficient than the single acting. It worked continuously since it did not rely upon gravity to force the pistonhead downward. Hence, it operated faster; but this, too, produced a new problem, for the engine might attain a speed that would shake it to pieces. Accordingly, Watt invented a mechanical "governor," which automatically regulated the rapidity of the piston stroke by controlling the flow of steam into the cylinder—one of the most interesting of all mechanical inventions. The governor was composed of two or more small metal balls, each of which was attached to a lever fastened to a staff geared to the engine. The faster the engine ran, the higher the balls rose. The lever resting on the governor then moved down, tilted its opposite end, lifted the lever controlling the flow of steam, and so determined the rate of the piston stroke.

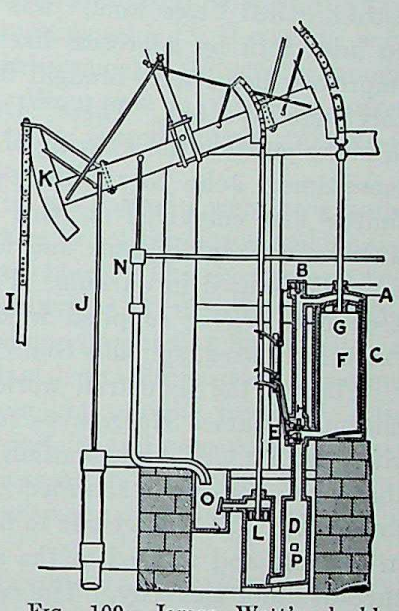


FIG. 109.—James Watt's double-acting steam engine. (*Courtesy of John M. Wiley Company.*)

Fertile imagination and tireless capacity drove Watt ever further along the path of invention. He wanted to have his engines turn lathes and wheels in mills and drive all manner of machinery. But the engines he had devised so far were designed only to pump water or obtain ore from mines. He conceived the idea of having the beam opposite the piston end operate a crank with a flywheel attached. The principle of the crank was a great discovery; no one knows who first made it, but it must have been invented in the Middle Ages. It was used commonly to turn grindstones, lathes, and similar devices. Unfortunately for Watt, a rival inventor and manufacturer of Bristol, named Matthew Washborough, heard of his idea and hastily patented it himself.

Watt was much chagrined but at once gave evidence of his great versatility. Not being able to use the crank, he promptly invented a clever device called the "sun-and-planet" wheel, which took the place of the simple crank and was used for a long time. Later, however, Watt used the crank device.

Many other inventions are ascribed to James Watt, but space does not permit a description of them. The steam engine has been described

in detail so that this marvelous invention may be readily understood. It produced the mechanical power that made the Industrial Revolution possible. There seemed to be no limit to the uses of the new engine, whether in spinning, weaving, mining, locomotion, or the manufacture of tools.

Spinning and Weaving Machines. While Watt was developing his steam engine, new inventions began to revolutionize spinning and weaving. Shortly after 1500, some inventor added a treadle to the common spinning wheel so that, free to use both hands, the operator was able to produce more yarn. The first notable improvements in weaving came in connection with the manufacture of cotton cloth. Raw cotton, called "tree wool," was imported from the Orient and worked up into cloth by a process like the one used in making woollen cloth. Improved looms were brought from the Netherlands, where they probably were invented. These "Dutch looms" were soon improved so as to make possible the weaving of several ribbons or strips of tape at the same time. John Kay of Bury (*d.* 1764) invented the revolutionary fly-shuttle first employed on such looms. This device carrying the weft was thrown rapidly back and forth across the warp much in the way a needle is used in darning. Previously, four spinners were required to keep one weaver supplied with yarn. As the flying shuttle became extensively used, spinners could not supply the demand for yarn.

Clearly, the industrial world was ready for an improved spinning machine. James Hargreaves (*d.* 1778), a carpenter and weaver, was gifted with a fertile imagination in mechanical matters. The story goes that when his wife overturned her spinning wheel the spindle continued to revolve. The idea came to him that a series of spindles might be set in a frame and rotated at the same time, thus producing a number of threads simultaneously. The machine he produced in 1767 was a wooden frame at one end of which were placed eight spindles in an upright position. Rotated by a crank operated by hand, they drew the threads through a series of clamps set in a bar moved back and forth by the left hand. In this way the operator regulated the threads that came from the rove. The virtue of the "spinning jenny," as Hargreaves called the new machine, was that thereby one operator could produce eight times as much thread as formerly.

Richard Arkwright (1732–1792), a barber of little education but great imagination, invented another kind of spinning machine. He passed the rove between a series of pairs of rollers run at different rates of speed. The resulting thread was hard and firm because tightly twisted by the rapidly revolving spindles, of which there were a number. But this spinning frame could not, like Hargreaves's spinning jenny, be operated by hand. The first spinning frames were run by horsepower for which

water power soon was substituted, whence the name "water frame" by which Arkwright's invention became widely known. Since the installation and operation of a water frame were expensive, Arkwright, who was a shrewd businessman, formed partnerships in which wealthy men provided capital to equip and maintain factories until production might become profitable.

Although wonderful, these inventions were far from perfect. Yarn produced by the spinning jenny was not strong enough, and the product of the water frame was too coarse to result in cloth of the best quality. Samuel Crompton (1753–1827) produced an invention in 1779 that combined the good qualities of Hargreaves's and Arkwright's machines and eliminated their defects. This invention was a hybrid between the two machines and hence was dubbed the "spinning mule." It was the only machine that would spin a cotton yarn thin, smooth, and strong enough to be used in weaving fine cotton cloth. From now on, it was no longer necessary to import cotton goods from India, though cotton goods continued to be called "calico," from Calicut, India.

Old-fashioned methods of spinning in the cottages were now quite out of date. The next problem was whether or not the looms could make use of all the yarn spun by the new machines. The answer was the power loom, an invention of Edmund Cartwright (1743–1823), a clergyman. He knew nothing about practical mechanics but had studied a mechanical chess player. He believed that if so complicated a machine could be produced a mechanical loom might also be invented. His machine, patented in 1785, was far from perfect, and successive improvements were necessary before a workable power loom appeared. It was not until the close of Cartwright's life that the power loom successfully began to supplant hand looms.

Other Inventions Affecting the Manufacture of Cotton Cloth. It is not necessary to discuss all the minor improvements and inventions that were indispensable in making the mechanical manufacture of cotton cloth a success. Thomas Bell discarded the practice of printing cloth by hand blocks, a laborious process that greatly raised the price of calico. In 1785, he made possible printing by cylinders, by means of a machine so simple and efficient that one person could print more calico in one day than two hundred by the older process. By 1799, cotton cloth was bleached by chemicals, which reduced by several months the time formerly required for the process.

An invention of paramount importance was the cotton "gin," or engine, invented by Eli Whitney (1765–1825) of Massachusetts and patented in 1794. Cotton fiber grows in a compact boll, together with seeds that look like very small beans. To pick the fibers from the seeds by hand was a laborious task; the most efficient worker could produce

only three or four pounds of clean fiber in a day. Whitney's device consisted of a hopper into which the fibers with seeds attached were fed. The rotating reel pressed the fibers against an iron grating composed of a number of parallel ribs. A series of circular sawlike devices caught the fibers, and as the seeds were too small to be pulled through the grating they were separated from the fibers. The fibers were detached from the circular sawlike devices by a drum provided with brushes and were blown out at the rear of the machine by means of a blast. This invention enabled one operator to produce several hundred pounds of cleaned cotton in a day. Production of cotton in the United States thereupon increased from 189,000 pounds in 1791 to 2,000,000 in 1860 and 5,000,000 in 1900.

What were the consequences of these inventions? They banished ancient methods of spinning, weaving, and cleaning cotton fibers, thus transforming the entire cotton-cloth industry. The manufacture of woolen cloth also was revolutionized, and these mechanical methods created for English merchants a monopoly of the cloth business, produced fortunes, created new social conditions, and radically altered political life. But before these changes are discussed, it is necessary to note similar transformations in the metal industries.

Iron and Coal Industries. As commerce and industry expanded and the demand for iron objects increased, metal industries were transformed. Formerly, iron had been extracted from ore placed in small furnaces filled with charcoal. As high a temperature as possible was produced by a hand bellows. This method not only was slow and expensive but consumed great quantities of charcoal. As a result, the forests of England rapidly diminished during the seventeenth and eighteenth centuries; and manufacturers were forced to turn to coal, of which there were plentiful deposits near Birmingham. Mines became deeper and the problem of pumping water from the lower levels led to the development of steam engines, the product of Worcester, Newcomen, and Watt. Such engines were also used for hoisting coal and, in Devon and Cornwall, were employed in mining tin.

Iron manufacturers at first did not know how to smelt iron with coal until the experiments of Abraham Darby (1677–1717) showed the way. He found that coal could be reduced to coke just as wood was made into charcoal. Coke proved to be as effective as charcoal and was much cheaper. Darby equipped his oven with a huge bellows driven by a water wheel, thus producing the first mechanically operated blast furnace, which greatly reduced the cost of iron. Darby also invented better and cheaper methods of casting iron pots and other ware, which the poorer classes bought in large quantities.

Great improvements further helped to revolutionize the iron industry and all industrial activity associated with it. John Smeaton (1724–

1792), an able Scottish engineer, discarded the leather and wood bellows used by Darby and substituted a pump composed of four metal cylinders provided with pistons and valves and operated by a water wheel. This invention greatly improved the efficiency of Darby's blast furnace; but the discoveries of Henry Cort (1740–1800) were even more important. He invented the process known as "puddling." Pig iron placed in a "reverberatory furnace" was heated by flame until it became decarbonized by means of the oxygen in the air circulating through it. Impurities were removed, and wrought or malleable iron was the result. Cort also invented the process of "rolling" the soft hot iron through grooved "puddle rolls" into bars. Thus was created a new iron industry in England. Pig-iron production jumped from 48,000 tons in 1740 to almost 8,000,000 in 1884, when there were 7,517 puddling furnaces in operation.

Tool Industry. The subsidiary industry of toolmaking came into existence in the eighteenth century. New tools were needed to be used in making the new machinery. They had to be exact, specially designed, and of hard metal. Screws, bolts, cams, and fittings of every description were in demand. The lathe, today a commonplace device in every machine shop, was still most imperfect, operated by a treadle and made largely of wood. Henry Maudslay (1771–1831), an engineer, greatly improved the lathe by constructing it entirely from iron. He also produced the slide rest, which enabled workmen to make more accurate cuttings. His screw-cutting lathe was provided with a measuring machine that registered down to 1/10,000 inch. Another significant innovation dating from 1774 was John Wilkinson's machine for boring cannon from solid castings. Soon, boring machines, constructed on the model of lathes, were employed to bore cylinders for steam engines. It had always been difficult to obtain accurate cylinders, but now the problem was overcome; the success of Watt's engines was in part due to Wilkinson's invention.

Potteries. Great changes were taking place in the manufacture of pottery. Josiah Wedgwood (1730–1795) developed his pottery works at Burslem in Staffordshire. He improved the artistic quality of pottery by perfecting glazes, introducing new ones, producing a better finish, and employing excellent designs. Patterns derived from the art of classical antiquity were freely employed and met with wide favor. There were many pottery-manufacturing establishments in Staffordshire, but Wedgwood's was the most successful. Pottery was produced there on a large scale under the new factory method (see below).

The Modern Factory System. The modern factory system is the coordinated production of goods by machine. Its establishment means that the entire economic organization of life becomes dominated by

machinery. The modern age therefore becomes more and more mechanized and is aptly described by the phrase the "machine age." The invention of the steam engine, which produced cheap mechanical power in huge amounts, proved decisive in the development of the factory system. By means of shafts, pulleys, and belts, power could be distributed throughout a factory and used to turn any kind of machine.

FIG. 110.—Wedgwood vase. (*Courtesy of the Metropolitan Museum of Art.*)

TRANSPORTATION. Roads, which are important in distributing the products of the factories, were still very primitive in the eighteenth century. Increased traffic due to growing population rendered ancient methods of transportation inadequate. Roads were mere avenues of mud or dust, depending upon season and weather, and wagons loaded with merchandise could only with difficulty be drawn over them during rainy seasons. People traveled on foot or on horseback. Merchandise frequently was carried on horseback. John McAdam (1756–1836), a Scot from Ayrshire, revolutionized road building. Being a road trustee, he decided that improvements were necessary and began experimenting at his own expense. His tests showed that roads should be elevated a little above the adjacent land and flanked by drains to carry off water. The surface of roads should be formed by successive layers of crushed rock composed of small cubical pieces weighing at most only six ounces. Gradually, the heavy traffic of wagons would press these down until finally a hard smooth surface was formed. As a result of these experiments, "macadamized" roads were extensively built; they revolutionized land traffic by making it speedier, safer, cheaper, and pleasanter.

The eighteenth century was a period of canal building. Canals had been common in the Netherlands during the Middle Ages, particularly in Holland and Flanders. John Smeaton (1724–1792) visited the Netherlands in order to study canals, harbors, and bridges. He planned the Eddystone Rock lighthouse on the Scilly Isles, which was completed in

1759. The Forth and Clyde Canal was begun under his direction in 1768. Another builder of canals was Charles Telford (1757–1834), who was charged in 1793 with the construction of the Ellesmere Canal connecting the Mersey and Severn rivers. To carry the water over the river Dee, he built a series of arches and abutments supporting a large cast-iron trough. He also began the Caledonian Canal, built bridges, and improved harbors in Scotland.

A remarkable aspect of the history of mechanical invention in the eighteenth century is the way in which one inventor took over a machine created by a predecessor, improved upon it, or made new applications of it. Watt, for example, was deeply indebted to Newcomen and others. His steam engine, in turn, was used by others in various ways for important new inventions, the first of which was the locomotive. If an engine could turn machinery, why could it not move itself? Watt, indeed, thought about this and even evolved plans for a model, but made no effort to construct one. He was too busy building steam engines to experiment with "steam carriages." Richard Trevithick built the first locomotive in 1803. It ran on wooden rails, hauled a number of wagons carrying 10 tons of iron, and attained a speed of 5 miles per hour, about that of a walking horse. Trevithick's curious locomotive was improved by William Hedley when he produced the *Puffing Billy* in 1813.

These were indeed remarkable inventions, but locomotives were still too slow to be useful. George Stephenson (1781–1848), an engineer, was employed to build a railroad from Liverpool to Manchester. The trains of cars were to be drawn by horses although the railway company would have preferred a steam locomotive. It offered a prize of $2,500 for the invention of a locomotive, weighing not more than 6 tons, that could attain a speed of 10 miles per hour. Three competing locomotives were tested in 1829, and Stephenson's *Rocket* easily won the contest. His locomotive never traveled more slowly than 12 miles per hour and at times went as fast as 29 miles. The Liverpool and Manchester Railway was opened in 1830, the first train composed of coaches carrying 600 passengers. The days of the ancient stagecoach were numbered.

While roads and canals were important in developing the industrialization of England, railroads were to prove even more vital. They provided rapid and cheap communication not only for persons but also for goods between industrial centers like Birmingham, Manchester, Leeds, and Sheffield and such ports as London, Southampton, Plymouth, Bristol, and Liverpool. As far back as the sixteenth century, wooden rails had been employed in mines, but iron rails were not thought of, it appears, until the eighteenth century. Then the new methods of manufacturing iron made it possible to produce large quantities of steel rails. Traveling on the railroads became safe, which contributed materially to the success

of the steam railway. A period of feverish railroad building ensued that soon connected every seaport and manufacturing center of England with the coal and iron mines.

If steam could draw coaches, why could it not propel boats? A number of experimenters worked with the idea. A Scot named Patrick Miller tried to propel a boat by means of paddles operated by men and animals. But the men tired quickly, and the animals took up too much space. William Symington believed that he could fit a steam engine into a boat to drive the paddles. In 1788, he and Miller made the first steamboat, which attained a speed of 5 miles per hour. This was an impractical boat, however, and it was not until 1802 that Symington

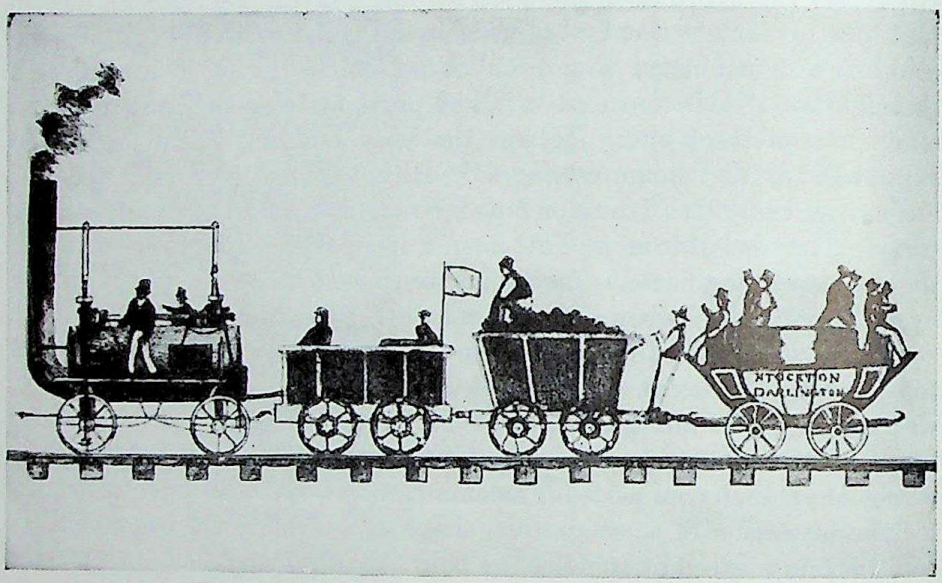


FIG. 111.—Stockton and Darlington Railway, 1825.

built a really useful vessel, the *Charlotte Dundas*, which pulled two barges, each carrying 70 tons, against a strong wind. But it so churned the waters of the Forth and Clyde Canal that authorities, fearing the banks would be damaged, discouraged its use.

The first entirely successful steamboat was invented in America. Robert Fulton resolved to improve upon the *Charlotte Dundas*. In 1807, he launched his *Clermont* on the Hudson River. It was equipped with a Watt engine that operated paddle wheels. His friends were so doubtful it would move that they dubbed the boat *Fulton's Folly*, but their humor turned into astonishment when it steamed up the river to Albany, a distance of 150 miles. Other inventors followed Fulton's example, notably Henry Bell of Glasgow, whose activities laid the foundations of the Scottish shipbuilding industry on the banks of the river Clyde.

Soon steamships began to sail the ocean. A great revolution in mechanics had been accomplished, one of the thrilling chapters in history.

INDUSTRIAL REVOLUTION IN AMERICA AND ON THE CONTINENT. By 1800, England led the world in the development of mechanized industry—perhaps her greatest contribution to modern civilization. Other countries followed the example of English businessmen. The United States, which had gained its independence from the mother country in 1783, was the first foreign country to introduce machinery from England. Samuel Slater, a man well acquainted with the new spinning machinery since he had served as an apprentice to Arkwright's partner, manufactured spinning equipment, formed partnerships, and began making

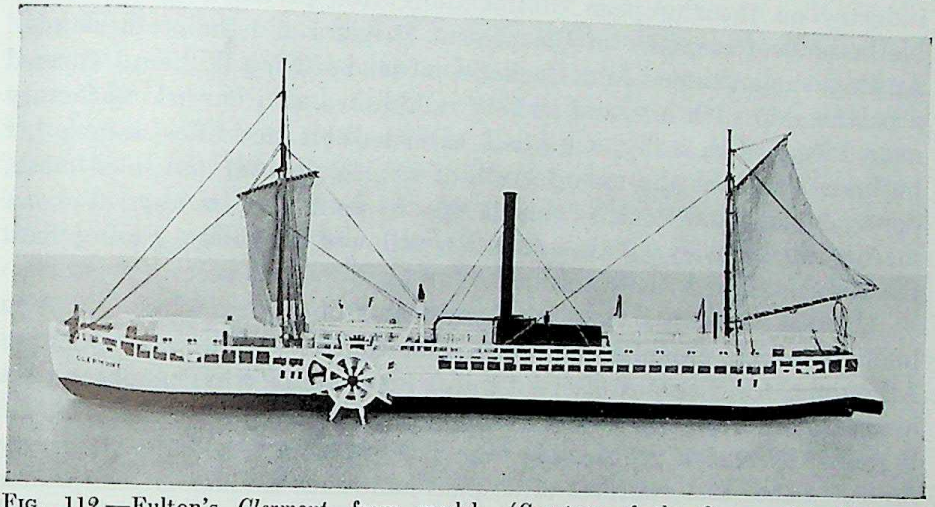


FIG. 112.—Fulton's *Clermont*, from model. (*Courtesy of the Commercial Museum, Philadelphia.*)

yarn in Rhode Island. Motive power was provided by negro slaves. This was the simple beginning of American industry. Yet within a generation it was to make New England the wealthiest, most influential industrial section of the United States.

Culture—and the machine culture of the Industrial Revolution forms no exception to this rule—spreads by diffusion, requiring decades, even generations, to become firmly established in distant lands. For example, today, two centuries after John Kay invented the flying shuttle, mechanical industry is just being introduced in some parts of Asia and South America. Continental Europe was slow in feeling the effects of the Industrial Revolution. Engaged in a desperate struggle with England from 1802 to 1813, Napoleon Bonaparte tried to stimulate industry in order to create resources with which to combat his enemies. He is in part responsible for the beet-sugar industry. Previously, sugar had been made from sugar cane brought from the West Indies, but now this trade

was cut off by the English fleet. Napoleon also attempted to stimulate mechanical weaving and spinning. It proved difficult to get machines, for the English refused to let them be exported. Nevertheless, the regime of Napoleon marks the beginning of the Industrial Revolution on the Continent.

One might assume that the Netherlanders would readily seize upon the new English methods of manufacture. They were interested chiefly in commerce, the distribution of spices and articles of luxury from the East Indies of which they had a monopoly, and the development of their shipping. Mechanical weaving and spinning were begun in Ghent before 1810. The first steps in setting up a really extensive machine industry on the European continent occurred in the kingdom of the Netherlands (composed of the present Belgium and the Netherlands). An Englishman named John Cockerill, a friend of King William I, formed a partnership with him and in 1817 established an ironworking factory near Liége. Gradually, Cockerill extended his activities into other businesses such as the manufacture of woolen, cotton, and linen cloth, paper, sugar, and tools. This is the beginning of modern Belgian mechanical industry. Other countries followed gradually, France first, the Rhineland and Austria next.

Capitalism and Banking. Large sums of money were needed to build factories, organize industries, and construct railroads. Richard Arkwright, for example, after inventing his spinning frame could not set himself up in business because he did not have the requisite capital. He therefore formed a partnership with men who furnished the necessary funds. Successful ventures often paid handsome dividends, and a new class of wealthy men sprang into existence. Today they would be called "captains of industry." In former times, of course, as has been noted, capitalism had been an important factor in commerce and industry. This is illustrated by the mercantile history of Italian cities like Florence, Lucca, Milan, and Venice, of the Netherlands, and of Germany. But the Industrial Revolution produced a new type of capitalism derived chiefly from the profits earned by mechanical industry. An entrepreneur, or captain of industry, could establish as many machines as he deemed desirable. Each machine did the work of many hands, and each working man supervised several machines. By this multiple-production method, factory owners increased their incomes in a fabulous manner. Greater sums of money than had ever been dreamed of came into existence. Consequently, an extensive commerce in money sprang up, the beginning of modern banking.

Early Effects of the Industrial Revolution. The Industrial Revolution was not accomplished within a few decades. Machines long remained imperfect; thus the revolution did not get under way until

about the third decade of the nineteenth century, and the social and political effects were experienced only gradually. Although the mechanization of industry greatly increased the production of goods and produced large fortunes, its first effect upon laborers who flocked to factories was by no means wholly beneficial. They were poor, having no resources other than the labor of their hands. They had left their village and country homes and abandoned the occupations they carried on there, because they could no longer compete with the factories. For years, peasants had clung to their spinning wheels and hand looms, but no matter how long or how hard they worked their earnings grew less and less. Those who had small farms managed to make some sort of living. Others who had scarcely more than a garden were forced to seek a livelihood in factories, often finding it difficult to obtain work; if they had received some money from the inclosing of their property, it was sometimes used up in living expenses before employment was obtained. People competed with each other in hiring themselves to entrepreneurs, with the result that wages were knocked down to starvation levels. Thus a new social class came into being—men who owned nothing, rented their homes, and were wholly dependent upon their daily earnings.

This depressed class, which later became known as the "proletariat," worked in cheaply built factories housing the maximum number of machines. Some machines were dangerous, for belts and pulleys were not enclosed. The work was exhausting, not so much because it was hard as because it was monotonous and exacting, and hours of labor were long. Nor were laborers sure of their jobs; the moment entrepreneurs had no orders for their product, they laid off workers with scant consideration for their welfare. Family life, which is normal for human beings and necessary for virtuous living, became increasingly difficult. Houses were constructed cheaply and with little regard to comfort or decency. Row on row, they lined long and dingy streets. Filth was everywhere, conditions were unsanitary, and vice flourished. Children at their tenderest age were required to work long hours. Women, including mothers, worked in the factories. Malnutrition was rampant, and diseases due to improper feeding were common. All in all, the Industrial Revolution, particularly in its earlier stages, produced serious social and political problems.

New Economic Ideas and Legislation. The new industrial arrangements were ideal for the entrepreneur bent upon making as much money as possible. He sold his goods at home and abroad and pocketed the profits. No guild could compete with him. Furthermore, his success influenced his economic views. He believed he should be free to run his business as he saw fit, in such a way as to produce the maximum earnings. He believed that guild restrictions and govern-

mental regulation should be abolished so as to give manufacturers complete freedom in the production and distribution of goods. This "hands-off" policy, called *laissez faire*, meaning "let alone," implied the fullest freedom in all things pertaining to industry. It was an ideal economic philosophy for the entrepreneur of the new Industrial Revolution. Although Adam Smith (1723–1790) did not invent the phrase *laissez faire*, he gave classic expression to the idea in his *Wealth of Nations* published in 1776, the year of the American Declaration of Independence. Adam Smith was the economic theorist of the early Industrial Revolution; his ideas on economic and political freedom later became known as "liberalism."

To grasp the far-reaching significance of this new economic outlook, it is necessary to understand the kind of economic ideas that controlled state and social action in the eighteenth century. Ever since the sixteenth century, it had been customary for the state to regulate commerce and industry. Thus the Spanish government maintained a mercantilist policy toward trade with her Mexican and South American colonies. Only Spaniards might trade there, and the economic life of the colonies was so regulated as to provide the maximum wealth to the mother country. Under mercantilist theories, colonies existed mainly for the welfare of the merchants of the homeland. The Netherlands supported a monopoly of trade with the East Indies carried on by the Dutch East India Company. This form of mercantilism proved so profitable that Colbert was moved to imitate it in France. England also was dominated by the same ideas. Her colonies, especially those in North America which later became the nucleus of the United States, were required to send their raw products in English ships directly to England. This enabled English merchants to make a profit from them before they reached the continental European market. Further, independent manufacturers in the colonies were discouraged.

So certain were English manufacturers that they could outsell competitors in the entire world that they disliked any restrictions on exports and imports. Further, they were eager to have free access to Spanish and other colonies in order to procure raw materials for those industries of which the Industrial Revolution gave them a practical monopoly. The advent of machine industry, therefore, was equally revolutionary in economic and political practices. Adam Smith, with his *Wealth of Nations*, and the general doctrine of *laissez faire* mark the end of mercantilism. The American Revolution (1775–1783), caused in part by colonial dislike of the mercantilist policies of the home government, was another blow to the old theories.

The unbridled laissez-faire policies of the earliest days of the Industrial Revolution, however, soon brought on a reaction. The exploitation

to which the workers were subjected aroused the opposition of people in whom humanitarian feeling had not entirely died. Legislation to regulate factory conditions in England began in 1802. The first factory act forbade employment of children younger than nine years, limited hours of labor to 12, and put an end to nightwork. "Apprentices" were to receive at least one suit of clothes each year and be given instruction in elementary branches of learning such as arithmetic. As we look back upon this act, we marvel that people could so callously exploit children. Other factory acts followed in 1833, 1844, and 1847. Several mine-regulation acts were passed, beginning with 1819. These acts were revolutionary because they interfered with the "personal rights" of entrepreneurs, a cardinal point in laissez-faire economics and political philosophy. More and more the state sought to regulate aspects of industrial activity. Wherever the Industrial Revolution occurred, whether in England, Belgium, France, or the United States, sooner or later such legislation was enacted.

The Industrial Revolution was one of the most significant epochs in history. By changing ancient methods of production, it revolutionized the daily life of the people. In importance it ranks with the discovery of agriculture, the domestication of animals, and the medieval commercial revolution. More than any other event, the Industrial Revolution demarcates our present life from that of the sixteenth century and the Middle Ages.

FOR FURTHER READING

ANDRADE, E. N. DA C.: *Engines*
BYRN, E. W.: *The Progress of Invention in the Nineteenth Century*
CHEYNEY, E. P.: *Industrial and Social History of England*
FAY, C. R.: *Great Britain from Adam Smith to the Present Day*
GRAS, N. S. B.: *Industrial Evolution*
HEATON, HERBERT: *Economic History of Europe*
LIPSON, EPHRAIM: *The Economic History of England*, Vols. II and III
MANTOUX, PAUL: *The Industrial Revolution in the Eighteenth Century*
MOFFIT, LOUIS: *England at the Eve of the Industrial Revolution*
OAKESHOTT, W. F.: *Commerce and Society. A Short History of Trade and Its Effect on Civilization*
REDFORD, ARTHUR: *The Economic History of England* (1760–1860)
SLATER, GILBERT: *The Making of Modern England*
TREVELYAN, G. M.: *England in the Nineteenth Century*
USHER, R. P.: *A History of Mechanical Inventions*

Chapter XL

AGE OF REASON: THE EIGHTEENTH CENTURY

Then say not man's imperfect, Heav'n in fault;
Say rather man's as perfect as he ought:
His knowledge measured to his state and place,
His time a moment, and a point his space.
If to be perfect in a certain sphere,
What matter soon or late, or here or there?
The blest today is as completely so
As who began a thousand years ago.

—Alexander Pope, *Essay on Man*

THE Age of Reason, which followed the Baroque Age, extended to the opening of the French Revolution in 1789. This period is also frequently referred to as the Age of Rationalism, the English "Enlightenment," the French *Illumination*, or the German *Aufklärung*. Intellectual movements, it must not be forgotten, cannot be confined within sharply fixed chronological limits; thus, the Age of Reason continued to influence the nineteenth and even the twentieth century.

Like most intellectual movements, rationalism had many aspects. Broadly speaking, it is the theory that from reason one may derive truth independently of the senses and that the truth as derived is superior to knowledge acquired through the senses. Some rationalists went so far as to deny the validity of data accumulated by means of the senses. Their standpoint was most important in the history of civilization. Possessing an excessive belief in the validity of reason independent of experience, they took a critical view of most aspects of culture, especially religion.

Descartes. Descartes's philosophy provided the intellectual foundation upon which eighteenth-century thinkers built their rationalist conceptions. Completely divorcing mind from matter, Descartes held that mind is in no way dependent upon the body or upon the physical world with which common sense tells us it is closely bound up. Certain knowledge is possible without consulting experience. Knowledge springs from a few clear and innate truths known simply through intuition. The reasoning of an intelligent person is sufficient to unlock the store of learning because it rests on this intuitive certitude, and such reasoning is more reliable than knowledge based upon the cultural experi-

ence of our forefathers. Religious beliefs, social conceptions, political organizations, and artistic ideas are to be disregarded because full of error and are to be replaced by a clear and mathematically sure knowledge obtained from pure reason.

Not all men accepted Descartes's ideas, however. Scientists like Newton and Huygens fortunately paid no attention to them as far as the study of nature was concerned. But philosophers and literary writers believed that "reason" alone is the keystone supporting science and religion; whatever was thought contrary to reason was rejected. This explains why rationalists cared little for history, considering it unnecessary to work laboriously to understand something of which they did not approve. Rationalism and idealism as embodied in Descartes's philosophy thus were in conflict with many aspects of the rich culture that had grown up in medieval times.

Rationalist Attitude toward Religion and Medieval Science and Philosophy. In the eyes of many, religion had become discredited. Serious changes had taken place in churches and church life since the Reformation. Governments were absolute; they assumed the right to define religion and enforce obedience to official doctrines. States with officially established religious bodies tried to repress groups that refused to conform. Furthermore, sectarian bickerings weakened all Protestant groups: Lutherans would have nothing to do with Calvinists, both condemned the Mennonites, and together they opposed the ancient Catholic church. Catholicism alone escaped the worst effects of the religious dissensions of the sixteenth century, thanks to its vigorous organization. The quiet of its religious life was only occasionally marred, as in the quarrels initiated by Jansen. But it suffered seriously from the control exercised by princes of Catholic states, who interfered in clerical matters.

The discrediting of medieval science impressed thoughtful men of this period. The ideas of Ptolemy, Galen, and other thinkers had been shown to be wrong, and new and more accurate conceptions had taken their place. Medieval science failed because its creators had not learned to develop scientific experimentation. When Copernicus, Kepler, and Galileo studied the heavens, an infinitely more complicated and awe-inspiring universe was revealed than had ever been dreamed of. Newton formulated the mathematical laws according to which the planets were held in their orbits. Vesalius revealed some of the complexities of human anatomy. Harvey and Malpighi studied the mysteries of the blood's circulation. Swammerdam and van Leeuwenhoek explored the world of microorganisms, though with inadequate microscopes. So astounding were these basic discoveries that few could grasp their import.

No one has ever regretted this collapse of medieval science. Since it was invalidated by the results of sustained experimentation and observation, it was condemned. The case of scholastic philosophy, however, was far different. Thomas Aquinas and other scholastic philosophers had exalted reason as much as Descartes or any of his followers. If led astray in particulars, they at least did not refuse to study the whole of human experience revealed in the cultural heritage of the time. But so great was the crash of scholastic science that the entire fabric of scholastic philosophy fell with it.

Alchemy and Astrology. Testing the truth solely in the light of a priori reasoning, rationalist philosophers destroyed ancient superstitions, which emphatically demanded critical investigation, and among these alchemy. For centuries, men had considered matter without an inkling as to its actual composition. Alchemy was a strange hodgepodge of magic, astrology, practical mineralogy, mystical philosophy, and fantastic notions. Alchemists tried to discover the philosopher's stone, potable gold, methods for the transmutation of metals, the elixir of life, and so on. They undoubtedly elucidated a few new principles, but as they worked in secrecy these helped little in developing chemistry. A mass of complicated and futile doctrines had come into existence by 1600. It was high time that the pretensions of alchemy were exploded. A beginning was made by Robert Boyle and George Stahl. It was slow work, however; even today there are quacks who toy with such ideas as the changing of base metal into gold.

Astrology had been popular in Greco-Roman times. During the Middle Ages, it rested upon Aristotelian and Ptolemaic teachings about the heavens. Michel Nostrodamus (1503–1566), a Jew born in France, was perhaps the most noted astrologer of his century. He became a court physician, a fact that throws a flood of light upon the character of medicine in the days of Paré and Fracastoro. Bacon, Kepler, and even the great Galileo believed in astrology and dabbled in it. Princes kept astrologers at court. Von Wallenstein, who fought many a successful battle in the Thirty Years' War (1618–1648), followed astrological advice punctiliously. But the new science of the universe at once robbed astrology of its scientific character. The work of scientists revealed a universe whose parts obeyed the laws formulated by Newton. The attraction that each part of the universe exerted upon every other part was rapidly becoming a universally recognized principle. Scientists consequently viewed age-old astrological notions with profound suspicion. But astrology lived on; for as capable men deserted it, quacks continued to exploit it.

Related to astrology was the belief that comets exerted a special influence on human affairs. It was thought they foretold such dire

events as famine, pestilence, war, and the death of popes, princes, and persons of exalted position. It was inevitable that the question of the influence of comets, like alchemy and astrology, should be subjected to the impartial scrutiny of the scientist. Copernicus, Galileo, Kepler, and Newton had revolutionized knowledge about the universe; did not the new data destroy the possibility that comets influence the course of human affairs? Nevertheless, the great comet that appeared in 1682 produced consternation. Edmund Halley (1656–1742), an English astronomer who followed in the footsteps of Newton, studied this comet carefully and discovered that it had appeared 76 years before. He found that it had also appeared in 1531. Had he investigated further, he might have learned that this comet appeared in 1066, when people predicted important consequences from it—among them William the Conqueror's conquest of England. Halley noted its orbit and predicted that it would appear again in 1759. Thus Halley discovered a principle known among astronomers as the "periodicity" of comets. He also hit upon a method of measuring the distance of the sun from the earth. Halley's work, however, did not immediately destroy the belief in the disastrous effects of comets.

Even before the appearance of Halley's comet, Johan Graevius (*d.* 1703), a professor at the University of Utrecht, issued a pamphlet protesting against the superstition that comets foretold events. Balthasar Bekker (1634–1698), also a Netherlander, studied the comets of 1680 and 1681 and Halley's of 1682. In 1683, he published his remarkable *Inquiry into the Meaning of Comets.* He argued that so long as no one knew exactly what comets were it was futile to make assumptions about their influence. He had studied the comets that, according to the prophecies, were to be followed by disastrous consequences but could discover no connection between such comets and deaths, pestilence, famine, or wars. Serious wars like the one in which the Dutch were assailed by France and England in 1672 had not been heralded by any comet. Reliance on astrology obviously was futile. A longer and perhaps more influential book was produced by Pierre Bayle (1647–1706), a refugee Huguenot who lived in the Netherlands. His *Various Thoughts on the Comet,* which appeared in 1682, was an elaborate refutation of the popular belief in the influence of comets.

Witchcraft. A belief in witchcraft still flourished during the seventeenth century, but this abominable superstition was also attacked by men brought up under the new scientific influences. It was still generally thought that evil spirits and the devil operated through witches and wizards. The practice of witchcraft had appeared long before the dawn of history. It was common in Egypt and Sumer. The Hebrews believed in witchcraft, as may be learned from the account of the witch

of Endor. The Greeks had similar ideas; one reads of them in the poems of Hesiod. Celts and Germans believed in fairies, elves, and sprites. The popular imagination created an immense company of evil spirits. One "authority" in the seventeenth century determined that there were 7,405,926 of these demons in the earth and air above! Witches and wizards, women and men who sold themselves to the devil or made pacts with him, performed, it was thought, all manner of evil. They

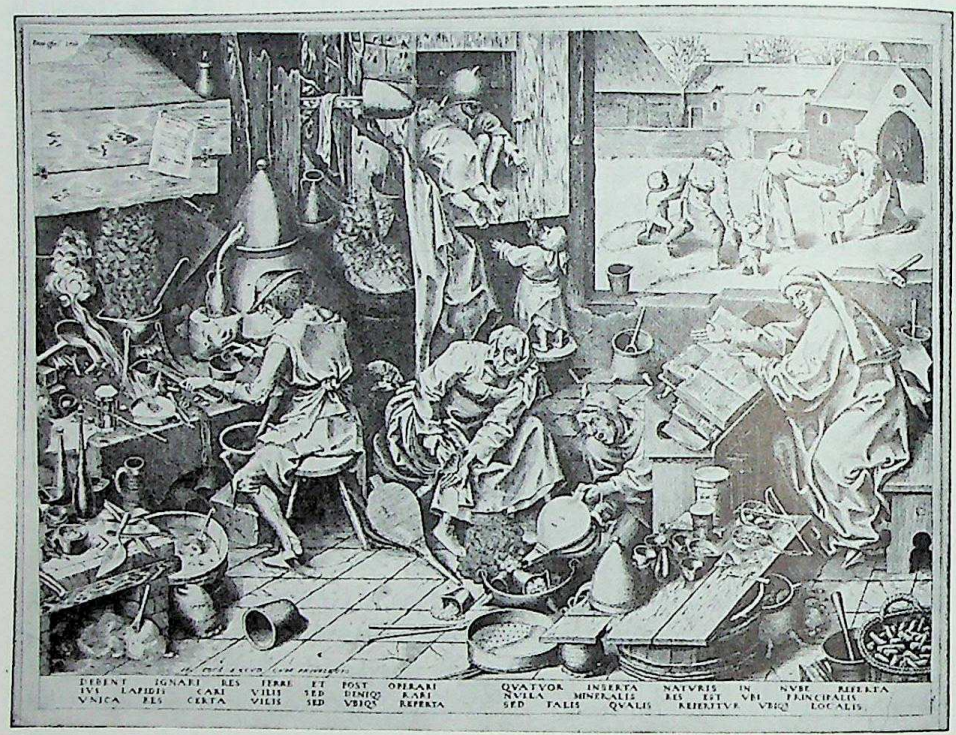


FIG. 113.—"Alchemist's Shop," by Peter Breughel. (*Courtesy of the Metropolitan Museum of Art.*)

caused children to be stillborn, afflicted babes with paralysis, induced madness, produced storms that ruined crops, brought on drought, and inflicted disease. They congregated in "Sabbaths" held between Friday and Saturday. Sometimes the devil himself appeared before them. Annually there was a vast parliament of witches, who rode to such meetings on broomsticks or on the backs of goats, animals the form of which the devil knew how to assume. David Tenier (*d.* 1690), a Flemish artist, painted an interesting picture showing the current notions of how witches prepared themselves for a Sabbath.

The consequences of this belief in witchcraft were serious. Those suspected of traffic with the devil were tortured. Old men and women, shaking with palsy, were suspect. A scar might be regarded as a "witches'

mark." Any gossiping man or woman, any person who was generally disliked might be accused. Conviction often resulted in death at the stake. The practitioners of witchcraft believed they could control unseen powers and inflict punishment through contact with the devil; they were thus consulted by people who wanted to gain some advantage or to damage their enemies, but naturally they were cordially hated and mistrusted. Many of them no doubt were in need of medical treatment, but humane ideas about such things had not yet come into existence.

Churchmen had vainly opposed witchcraft. In 1484, Innocent VIII, Pope from 1484 to 1492, issued the bull *Summis desiderantes* denouncing the belief and practice of witchcraft and created a tribunal to eradicate them in the Rhineland. Priests classified many cases as a guide for legal practice. This guide, the *Malleus maleficarum*, or *Witches' Hammer*, gained much fame and was followed by similar manuals. Later, John Weyer (1515–1588), a Netherlander, wrote *On the Illusions of Demons and on Incantations and Poisoners* in 1563. He held that people who practiced witchcraft or were accused of it suffered from mental maladies. A Jesuit priest, Frederick von Spee (1591–1635), took up his arguments and elaborated them. Reginald Scott (*d.* 1599), an Englishman, wrote his *Discovery of Witchcraft* with the object of halting witch-hunting.

Such sentiments, however, ran counter to the beliefs of many theologians, lawyers, philosophers, scientists, statesmen, and common people. Thus the great Jean Bodin, who discoursed brilliantly on political matters during the Wars of Religion in France wrote the *Demonology of Sorcerers* in 1580, in which he reproduced the "scientific" arguments for belief in witchcraft. James I, king of England from 1603 to 1625, incensed by Scott's *Discovery of Witchcraft*, wrote a book refuting it. Matthew Hopkins (*d.* 1647), an Englishman, was active in ferreting out witches. With two assistants he rode about the country examining persons accused of witchcraft. John Gaule, a parson in Huntingdonshire, criticized these proceedings, objecting that "every old woman with a wrinkled face, furred brow, a hairy lip, a gobber tooth, a squint eye, a squeaking voice, or a scolding tongue, having a ragged coat on her back, a skullcap on her head, and a dog or cat by her side is not only suspected but pronounced a witch." Hopkins, who styled himself "witch-finder general," was finally himself accused of having relations with evil spirits. The tortures he had mercilessly applied to others were inflicted upon him. His thumbs and toes were mutilated; and, after undergoing the ordeal by water, he was hanged.

Balthasar Bekker (1634–1698), a Netherlander, produced the most devastating attack on the belief in witchcraft in *The Bewitched World*, which, translated into French and German, became widely known. He drew some decisive arguments from the books of his predecessors but

added new ones. Strongly opposed by many, he was disciplined by the official Reformed church of the Netherlands. The philosophy of Descartes and the new science produced by Kepler, Galileo, and Newton presented to educated people of the eighteenth century a universe seemingly governed by law in which the capricious activities of evil spirits had no place.

Punishment of Criminals. Like witchcraft and kindred superstitions, the barbarous punishments meted out to criminals were much criticized during the Age of Reason. Penal codes demanded exceptionally severe punishments. Public executions were common. Quartering, tearing asunder by horses, breaking on the wheel, lacerating the flesh with red-hot pincers, and mutilation before execution were commonly inflicted. Punishments for those guilty of minor offenses were unduly severe. Torture was employed to extort admissions of guilt. Such penalties had long been in existence; they dated from medieval and classical times.

Christian Thomasius (1655–1728), one of the most significant German scholars of the Age of Reason, attracted many students while he was professor at the University of Halle. Influenced by Bekker, whose monumental work on witchcraft he helped to popularize in Germany, he vigorously challenged customs hoary with age and irrational from the standpoint of his day. He gained enemies by attacking the belief in witchcraft, the methods employed in suppressing it, and especially the penalties inflicted upon criminals. Thomasius' influence helped to mitigate the severity of German criminal codes. Similar services were rendered by the Italian jurist Cesare di Beccaria (1735–1794). He wrote an influential book, *On Crimes and Punishment*, which proved so popular that six editions appeared in 18 months. It is interesting to note that the custom of inflicting barbarous punishments on witches and criminals had practically vanished by the close of the eighteenth century. The improvement of conditions in prisons and the introduction of more lenient codes, however, were deferred until the next century.

Deism. How the new scientific ideas of the seventeenth century influenced religious thought is well shown by Joseph Addison's *Divine Ode*. In the first two stanzas, Addison (1672–1719) gives splendid expression to the Newtonian ideas about the universe, which, it was believed, was governed by a majestic law.

> The spacious firmament on high,
> With all the blue ethereal sky,
> And spangled heavens, a shining frame,
> Their great Original proclaim.
> The unwearied sun from day to day
> Does his Creator's power display,

And publishes to every land
The work of an almighty Hand.

Soon as the evening shades prevail,
The moon takes up the wond'rous tale,
And nightly to the listening earth,
Repeats the story of her birth;
Whilst all the stars that round her burn,
And all the planets in their turn,
Confirm the tidings as they roll,
And spread the truth from pole to pole.

Deism is the term applied to the religious thinking of the eighteenth-century rationalists, who thought that in a world governed by such physical laws as Kepler, Galileo, and Newton had revealed there was little need for the special intervention of God. The universe, endowed with certain laws, operated mechanically in obedience to them. God stood outside the universe; as Creator, He had decreed, at the moment of creation, how it should function. This way of thinking is reflected in the third stanza of Addison's *Divine Ode.*

What though in solemn silence all
Move round this dark terrestrial ball;
What though no real voice nor sound
Amidst their radiant orbs be found:
In reason's ear they all rejoice,
And utter forth a glorious voice;
For ever singing as they shine,
"The Hand that made us is divine."

The attitude of deists toward the Christian religion is important to note. Deists were not atheists; they believed in God but refused to believe that He ever interfered in the operation of the universe. They were strongly opposed to the special features of Christianity such as the belief in miracles, revelation, the appearance of the Son in the person of Jesus, and the Resurrection. They believed in a general body of religious thought instilled by the Creator. This included the usual rules of practical morality. The special doctrines of Christianity and of other religions as well were regarded as "superstitions." Deists attacked priests and ministers as well as the rites, ceremonies, and institutions of established churches, whether Catholic or Protestant.

There were many advocates of deistic conceptions in England. One of these, Matthew Tindal (1656–1733), published a book called *Christianity as Old as the Creation.* Its title indicates exactly how deists viewed Christianity as opposed to other religions. It asserted that the good

features of Christianity were present in earlier religions. In fact, Christianity was not much superior to pagan religions or pagan philosophies. Thomas Woolston (1669–1731) wrote his *Discourses on the Miracles of Our Saviour* at about the same time. He held that the miraculous deeds of Jesus were mythical and absurd. He also bitterly attacked priests who accepted them as true. Another writer, Peter Annet (1693–1760), denied the accounts concerning the Resurrection as told by St. Paul and the Evangelists and believed by early Christians. His book, *The Resurrection of Jesus Examined by a Moral Philosopher* (1744), may be regarded as typical of deistic thought.

One of the most famous of the deists was Thomas Paine (1737–1809), an American, who wrote *The Age of Reason*. Regarding Jesus he wrote as follows:

> He was a virtuous and an amiable man. The morality that he preached and practiced was of the most benevolent kind; and though similar systems of morality had been preached by Confucius and by some Greek philosophers, many years before; by the Quakers since; and by many good men in all ages, it has not been exceeded by any.

Bayle. Pierre Bayle (*d.* 1706) was in many respects the classic skeptic of the age. Although he lived during the age of Louis XIV, he exerted so much influence during the Age of Reason that we naturally think of him as belonging to that period. He was born a Huguenot but became a Catholic, only to return to Protestantism. France was a dangerous country for a lapsed heretic of this sort. His brother suffered death for his religion. Bayle fled to the Netherlands, where he secured a teaching post in Rotterdam. Here he won the dislike of Catholics as well as Protestants and finally was deprived of his position through the opposition of the clergy of the Reformed church. He employed his immense learning in an attempt to show that religious beliefs and official teachings were myths or fairy tales. Bayle argued that all should be free to believe any creed and even to persecute. His *Historical and Critical Dictionary* is a milestone in the development of modern thought. It became an authoritative textbook on religious and philosophical opinion.

Voltaire. Voltaire (1694–1778) was the literary lion of the age, much as Petrarch had been during the early Renaissance and Erasmus during the Reformation. His life spanned the Age of Reason; no person more fully or more ably represented the period. He had a keen intellect, a satirical pen, and a lucid style. He had a piercing glance and an emaciated body which, like that of Erasmus, often became violently ill without apparent cause. Although brought up under the Jesuits, he never became a thorough or an exact student.

Voltaire held that the universe was governed by laws revealed by scientists like Newton. In creating the world, God endowed it with physical laws according to which it has functioned ever since. Voltaire was a deist, skeptical of God's intervention in the affairs of this world. Influenced by Pierre Bayle, he doubted official dogmas and popular beliefs. A bitter opponent of sham and hypocrisy, he hated the farcical public religious life of the noble and upper classes of France, corrupted by the control that king and court exercised over abbots and bishops. Hating the persecutions of Louis XIV and Louis XV, he labored to stir up public opinion against them. *Ecrasez l'infâme,* "crush the infamous thing," is the phrase that often appeared at the end of his letters. This "infamous thing" was not Christianity; rather, it was the politically managed church of France.

Voltaire wrote poems, tragedies, comedies, tales, histories, and an encyclopedia; in addition, he carried on a voluminous correspondence. A complete collection of his literary labors embraces fifty volumes. His *Candide* is a romantic tale in which skepticism toward philosophy and religion and a tender feeling for the oppressed are combined. His *Oedipe* is a play based on the old Greek theme once popularized by Sophocles. In it Voltaire states boldly that "priests are not what a vain people think; our credulity forms the substance of their knowledge!" His *Letters on the English* expresses admiration for the attitude of the English people and their government toward learning, science, religion, freedom of the press, and similar matters and really constitutes a criticism of the monarchy of Louis XV (1715–1774). The *Philosophical Letters* attacks the stupidity of French governmental absolutism and its dominating connection with the Christian faith. Through these works, Voltaire became a most influential propagandist for the ideas of the Age of Reason.

Attitude toward Medieval Culture. Voltaire's age did not understand the profound importance of medieval culture in the history of civilization. The men of the Age of Reason hated revealed religion and the church, the visible institution of the Christian community. Further, they inherited the Renaissance prejudice against medieval culture. Scholars of the Renaissance had turned to classical antiquity for inspiration, thinking that all artistic and cultural excellence was contained in the experience of the Greeks and Romans. Hence, the writers of the Age of Reason copied classical artistic forms and adopted ancient pagan ideas. The result was a deep-seated and stubborn prejudice against medieval culture and a complete misunderstanding of it.

This hostility is illustrated by Molière's disparagement of Gothic architecture in favor of the new style that had come from Italy. Molière's verses show that even during the reign of Louis XIV this dislike of

medieval culture was powerful. He speaks as follows of a new church constructed in the classical style of the late Renaissance and of Gothic art:

> Seasoned with the salt of antique charms
> And not by the insipid taste of Gothic monuments,
> Those hateful monsters of ignorant times
> Which unloosed the torrents of barbarism
> That have flooded nearly the whole earth,
> Made mortal war upon every refinement,
> Struck down the battlements of great Rome
> And destroyed the fine arts when it ruined the Empire.

Historians in the Age of Reason. Voltaire produced several influential historical works. His *Age of Louis XIV* presents the general spirit of the reign rather than its military and political achievements. The collective life of mankind was what interested Voltaire; thus, his *Universal History* aimed to embrace the common experience of mankind. Voltaire was not a careful searcher after historical truth but simply shaped the facts to illustrate his theories. Revealed religion and especially Christianity were, to his mind, responsible for many of man's ills. The course of civilization moved between human stupidity, superstition, and religion on the one hand and the pure light of reason on the other. Voltaire's method of treatment deprived history of much of the stuff from which it is made. Nevertheless, his work is significant in marking a stage in the growth of historical writing, especially cultural history.

Montesquieu. De Montesquieu (1689–1755), a younger contemporary of Voltaire, was a confirmed skeptic. He produced a famous satire, *The Persian Letters*, a correspondence purported to be between two Persian gentlemen about the state, society, government, and religion of France and other aspects of French life. In his *Spirit of Laws*, a work typical of the Age of Reason, De Montesquieu sought to discover from a study of history the conditions that formed the government and society of peoples. He differed from Voltaire and other rationalists in that he was willing to study historical antecedents with much thoroughness. He felt that no one perfect form of government could be found for all people but that circumstances, especially climatic and geographical conditions, influence the character of state and society. He therefore had little faith in reason as the sole source from which a science of politics could be constructed. Because he tried to study the origin of institutions historically and in the light of their physical environment, he had scant sympathy for such hypothetical and imaginary conceptions as the "state of nature" and the "social contract" so popular at this time.

The Spirit of Laws contained a flattering description of the English political system. De Montesquieu admired the separation of English

governmental powers into the executive, legislative, and judicial. So enthusiastically were these features described that political philosophers began to study them, and De Montesquieu's influence spread wherever there were admirers of French culture. His conception of the virtues of the English system influenced the American Constitution as it was formulated. This is one reason why there is a division of powers among the executive, judicial, and legislative functions of the United States government. De Montesquieu believed that such division would make tyranny forever impossible.

Edward Gibbon. Edward Gibbon (1737–1794) was one of the most influential of the historians of the Age of Reason. His *Decline and Fall of the Roman Empire* traced the disintegration of Rome to 1453. It was the greatest historical work yet undertaken; in general, it was superior to any other piece of historical scholarship produced during the eighteenth century. Nevertheless, it had serious defects. Gibbon had a keen appreciation for the Roman past characteristic of the Age of Reason. To him the demise of ancient civilization was a tragedy, due partly to the assaults of barbarians and partly to Christianity, about which he had little good to say. But he did not comprehend the achievements of the Middle Ages and failed to grasp the role of religion in the formation of culture and to understand the character of the Byzantine Empire. Thus was perpetuated a series of prejudices that were not dissipated until the rise of historical criticism in the nineteenth century.

Philosophy in the Age of Reason. The Age of Reason has a distinct philosophical flavor, due to the character of the cultural complex evolved from the time of Descartes and Newton. John Locke (1632–1704), an Englishman, was deeply interested in philosophy. He found Scholasticism still generally accepted at Oxford but became interested in the philosophy of Descartes, without accepting it completely, however. His thought was practical and concrete. In 1690, he wrote his celebrated *Essay concerning Human Understanding*, in which he denied the teaching of Descartes that there are innate ideas, maintaining that the mind is a *tabula rasa*, a blank sheet. Whatever is written upon it is recorded by sensations received from the external world. If the representation we form of something is identical with its original, we are thinking correctly. As all ideas come through our senses, Locke's philosophy is called "sensationalism." Locke taught that sensations, however, do not tell us what objects really are. They merely present to our minds their qualities, such as weight, size, color, odor, taste, shape, and number. This theory is called "idealism," for knowledge consists only in ideas about things and not in knowledge of the things themselves. Hence, all knowledge is probable and never absolute.

On the other hand, Locke believed that there are matters about which our senses furnish us with no knowledge whatsoever. Among these are such propositions as immortality and the Resurrection. But although such matters are beyond the pale of reason, they are by no means contrary to it and Locke accepted them on faith. These ideas were set forth in his *Reasonableness of Christianity*.

Locke's confirmed skepticism about the claims to established authority in religion such as those of the Pope or the Anglican church made him disbelieve in the right of governments to punish persons for not accepting beliefs officially declared legal. His *Letters on Toleration* argued that all Christians should be given religious freedom save those who rejected the Trinity. He believed, however, that Catholics and those who positively denied the existence of God should not be accorded such freedom. Locke also wrote an important essay entitled *On Education*. His two *Treatises of Government* and the theory of government contained in them have been referred to previously (see page 649).

From now on, the study of first causes, which had received much attention in scholastic philosophy, was stressed less and less. Philosophers became increasingly skeptical about the Final Cause of all things and even the ability of man to know anything concerning the external world. Locke's followers took up his ideas where he had left them and came to hold an out-and-out "subjective idealism." George Berkeley (1685–1753), for example, argued that the "qualities" of things are ideas formed in the mind and mere representations of things outside it. He even held that "substance" is merely our idea of it. According to Berkeley, therefore, the only things that exist are ideas formed in the mind. Hence his saying *esse est percipi*, "to be is to be perceived." His *Essay towards a New Theory of Vision* and *Principles of Human Knowledge*, which advance these ideas, are among his more important works.

David Hume (1711–1776) carried the ideas of Locke and Berkeley to their logical conclusion. Born in Edinburgh, he practiced law and held various political positions. He spent his leisure in philosophical study and wrote several books, the most notable being his *Treatise of Human Nature* and *Enquiry concerning Human Understanding*.

Hume taught that ideas are the product of sensations and are mere mental states. Only mental states are known—one cannot know the external world. There is no such thing as causality, as taught by scholastic philosophy. We see one thing after another chronologically taking place, but we have no right to assume a causal relation between them. In this way, Hume sought to destroy the whole system of causality worked out by Aristotle, taught by Aquinas, and advanced by philosophers since. Hume's position represents the extreme development

of subjective idealism, or, as it is commonly referred to, "solipsism," the doctrine that the self is the only existent thing.

These conceptions, which led thinkers straight into the quagmire of skepticism, spread to France and other parts of Europe. De Condillac (1715–1780), for example, taught that all ideas are derived from the senses. While there may be something external to ourselves, we can know little or nothing about it. This was a thoroughgoing solipsism, and thereafter appeared a new doctrine of materialism. Idealist philosophers like Berkeley and Hume had become thoroughly skeptical of the existence of matter or at least of the ability of the mind to know anything about it. They had derived their ideas from Descartes, who, as we have pointed out, had assumed the coexistence of mind and matter. They stressed that part of Descartes's philosophy which contained his doctrine about mind, and finally surrendered themselves to the nihilism of skepticism.

Other philosophers adopted a thoroughly materialist position. Even in the seventeenth century, there had been materialists. Thus Thomas Hobbes (*d.* 1679), as pointed out in a previous chapter, taught a simple materialistic system, holding that "all substances are bodies." Joseph Priestley (1732–1804), the noted scientist, argued that the soul is simply a material substance and that thought is but a mechanical result of the activity of a material brain. Baron von Holbach (1723–1780), a German philosopher, held that there are only two basic things, matter and motion, both of which are external. Sensation and knowledge are mere consequences of matter in movement. Similar doctrines were entertained by Denis Diderot (1723–1789) and D'alembert (1717–1783).

These characteristic philosophies of the skeptical Age of Reason sprang from the crash of Aristotelianism and degenerate forms of scholasticism. The cultural complex of European life was changing with astonishing rapidity. Old views were outworn; customs and institutions were subjected to acid criticism. The work of Voltaire, carried further by a group of clever propagandists, was of the greatest importance in this respect. Diderot, De Condillac, and D'alembert in 1762 began to publish their *Encyclopédie* of seventeen folio volumes containing in all 16,288 pages. A number of encyclopedias had appeared during the earlier years of the eighteenth century. We have noticed Pierre Bayle's *Historical and Critical Dictionary* and Voltaire's *Philosophical Dictionary*, neither of which was a systematic catalogue of all knowledge, however. The first modern encyclopedia to present a complete outline of things known was the one by Ephraim Chambers, the initial two-volume edition of which appeared in London in 1728. The *Encyclopédie* was intended to be a translation and extension of Chambers's encyclopedia, but it really was a new work. The most influential single literary production

of the Age of Reason, it set forth many new facts and notions in popular form. It was deistic, heretical, opposed to ecclesiasticism, critical of despotic government, and optimistic in its views about progress.

Government and Social Conditions. The opinions of such philosophers and propagandists as those discussed above had a marked influence upon conceptions of government. Princes still held to the theory that they ruled by divine right but now began to change their ideas about the purpose of government. They sought to shape their acts to the philosophy of the age. Their governments became "benevolent"; states were managed *by* princes but *for* the people. Frederick the Great, who ruled Prussia from 1740 to 1786, was the first great benevolent despot. He stimulated agriculture, commerce, and manufactures, simplified law, improved finances, encouraged letters and learning, favored the universities, established freedom of religion and printing, and created an effective government. His example was followed by Emperor Joseph II of the Holy Roman Empire, who ruled from 1765 to 1790, and by other princes in Naples, Spain, Portugal, Denmark. The reign of Catherine the Great (1762–1796) of Russia is a brilliant example of benevolent despotism. Most of these rulers were jealous of the privileges of the clergy and showed great hostility toward religious orders, particularly the Jesuits, and their influence was sufficiently great to cause the Pope to abolish that order in 1773. The benevolent despots also curtailed the excessive privileges of nobles and towns and in some cases put an end to the remaining traces of serfdom. Portugal, for example, made slavery within her realm illegal.

An aristocratic tone pervaded social life. The nobility filled positions of authority and influence not only in the state but also in the church. The government of princes was thought to be a divinely given right. To many it appeared that the ascendancy of the aristocracy also rested on the same basis. Although especially typical of French life, these conceptions met with wide favor throughout Europe. French manners, thought, letters, and art were accepted everywhere. People who pretended to intellectual development habitually spoke French in their businesses and even in their homes.

An undertone of middle-class conceptions was noticeable, however, even in France. This was natural, for the group that creates the wealth of the country is bound to make its power felt. Such influences found expressions in the paintings of Jean Chardin (1699–1779) and Jean Baptiste Greuze (1725–1805). These French artists preferred to depicit ordinary folk, children, and domestic scenes. It was in the Netherlands, however, that middle-class interests found their fullest expression, though even here aristocratic ideas were powerful. In England after 1688, the year of the Glorious Revolution in which James II, who believed he

ruled by divine right, was supplanted by William III and Mary, who derived their authority from Parliament, middle-class influences found ready expression. This is what we should expect, for England was passing through a period of remarkable commercial prosperity. The mechanization of industry caused by the invention of the steam engine and mechanical spinning and weaving devices also brought the interests of common people to the fore. These interests were destined to supplant aristocratic culture in the near future.

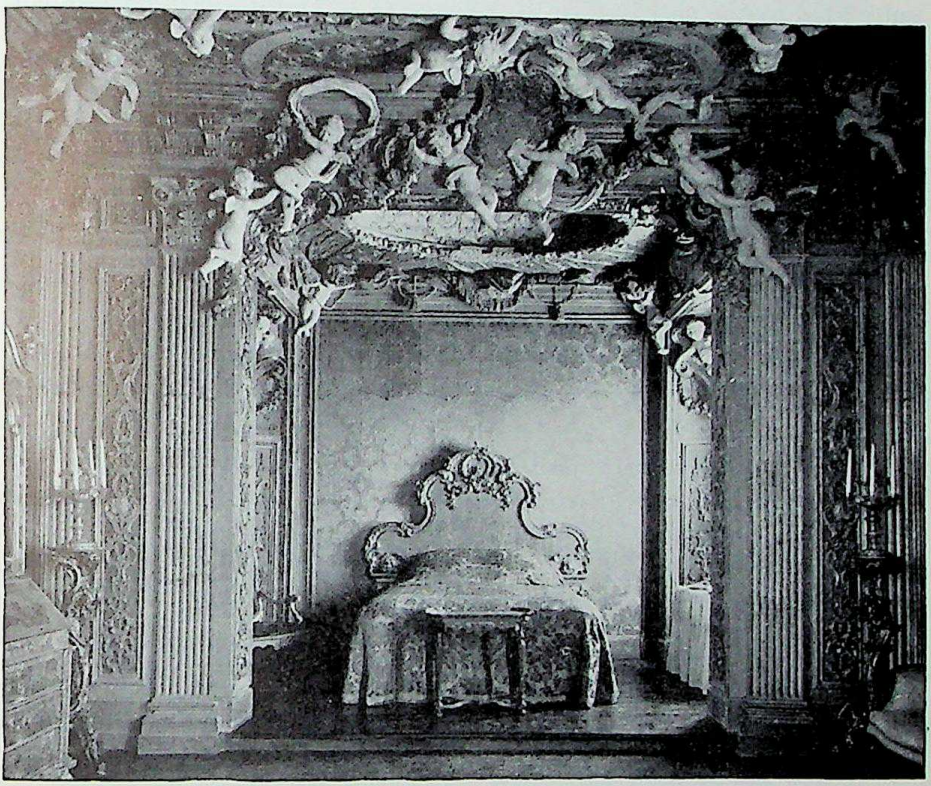


FIG. 114.—Rococo bedroom, Venice. (*Courtesy of the Metropolitan Museum of Art.*)

In France there was some criticism of the economic policies of the government, which for more than a century had followed a mercantilist policy. During the reign of Louis XV the methods employed in collecting taxes were leading France to the brink of ruin. Tax farmers who bought the privilege of collecting taxes extorted huge sums from the defenseless lower classes, especially the peasantry. There now appeared a group of economists called physiocrats, of whom François Quesnay (1694–1774) was the most prominent. They believed that the government should not seek to regulate labor and that agriculture, mining, fishing, and industries organized to further them were the only activities that

enriched the nation. No special privileges or monopolies were to be tolerated; there was to be complete freedom of buying and selling. The physiocrats were important for two reasons. (1) Their doctrines were a criticism of current methods of government. (2) They helped lay the foundations of the study of political economy. It was they who coined the phrase *laissez faire* later adopted by Adam Smith, author of *The Wealth of Nations*.

Art Forms of the Eighteenth Century. Literature was especially cultivated by the middle class, to which men like Voltaire, Montesquieu, and the Encyclopedists belonged. These writers showed themselves more creative than the nobility, who were interested chiefly in conserving their privileges. But although it often revealed middle-class interests, in form and theme it was dominated by ancient Greek and Roman models. In other words, the writers of the middle classes imitated classical writers just as the Humanists of the Renaissance had done, but they wrote in the mother tongue. The drama was patterned after Seneca's plays. Poets imitated the forms of Vergil and Horace. Lucid expression, balanced construction, deftly turned phrases, and classical allusions were admired. Alexander Pope (1688–1744) represents this trend in England. His *Essay on Man* is a deistic moralization, composed of rhyming couplets.

> Know then thyself, presume not God to scan;
> The proper study of mankind is Man.
> Placed on this isthmus of a middle state,
> A being darkly wise, and rudely great:
> With too much knowledge for the Sceptic side,
> With too much weakness for the Stoic's pride,
> He hangs between, in doubt to act or rest; . . .
> Created half to rise, and half to fall;
> Great lord of all things, yet a prey to all;
> Sole judge of truth, in endless error hurl'd;
> The glory, jest, and riddle of the world!

To the art of the age of Louis XV has been applied the term "rococo," derived from the French word *rocaille*, or rockwork, as in artificial grottoes fantastically built in the gardens of Versailles and elsewhere. The term applies especially to interior decoration, furniture, and elaborate costume. Rococo art continued many of the ideas of the Baroque Period but, abandoning the solidity and gravity of the latter, became playful and susceptible to foreign influences. Chinese characteristics may be noted. Twisted curves, fantastically combined, gave a restless effect. Rococo painting, like interior decoration and Louis XV furniture, was the art of a decadent aristocracy that enjoyed an assured place in the world. Refined to a degree, it had slight contact with the world of

the ordinary man. Colors were no longer rich and deep as in Flemish pictures. The heavy shadows of Rembrandt, Frans Hals, Ruysdael, and other artists were abandoned. Backgrounds were made light. The delicate tints of silks and satins were imitated with considerable success.

Jean Antoine Watteau (1684–1721) may be said to have initiated the rococo style in painting. For the strong coloring of Dutch artists

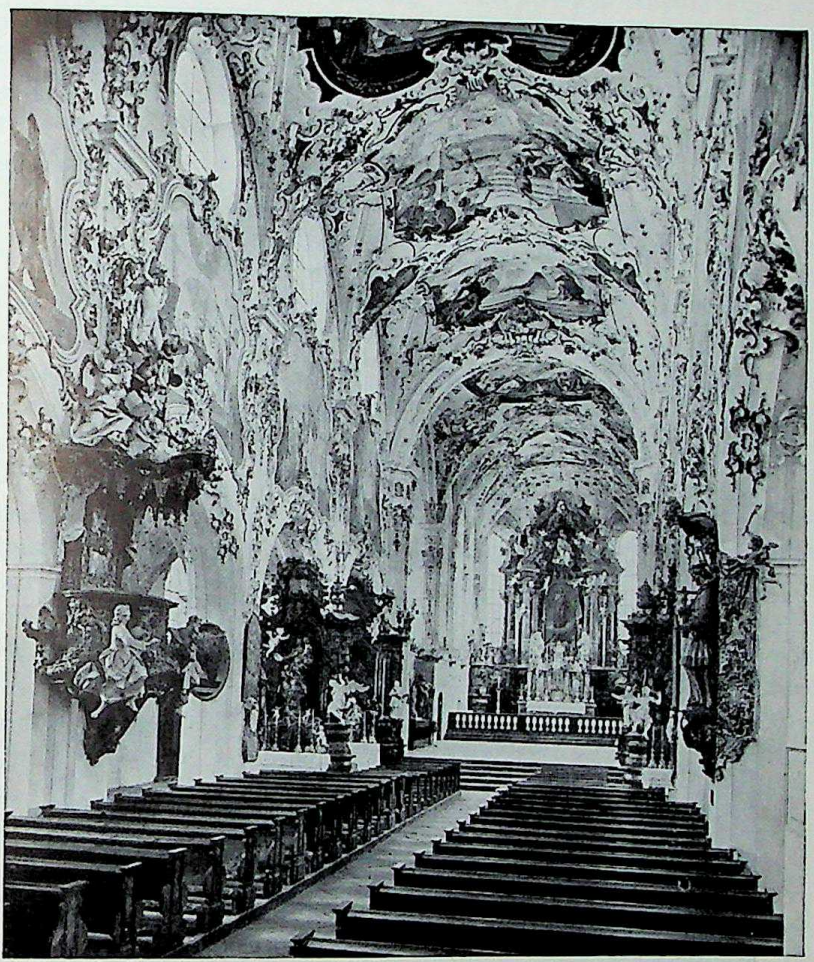


FIG. 115.—Baroque and rococo interior, Abbey of Rottenbuch, Austria. (*Courtesy of the German Railways.*)

he substituted delicate tints. Painting for the aristocracy of France, he drew his scenes from court life and the theater or depicted groups in idyllic rural settings among trees on the edges of open fields. His "Iris" is an excellent example of this new art. François Boucher (1703–1770) was perhaps the most typical of rococo artists. His portrait of Mme de Pompadour portrays a woman dressed in the elaborate and

delicately colored silk costume of the time, her skin possessing an aristocratic refinement and a pleasing rosy hue. Boucher painted pastoral scenes that remind one of Vergil's poetry and such classical mythological pictures as "Diana Quitting the Bath." This art, we see, was not of the people; it belonged to the aristocratic society of noble ladies and gentlemen.

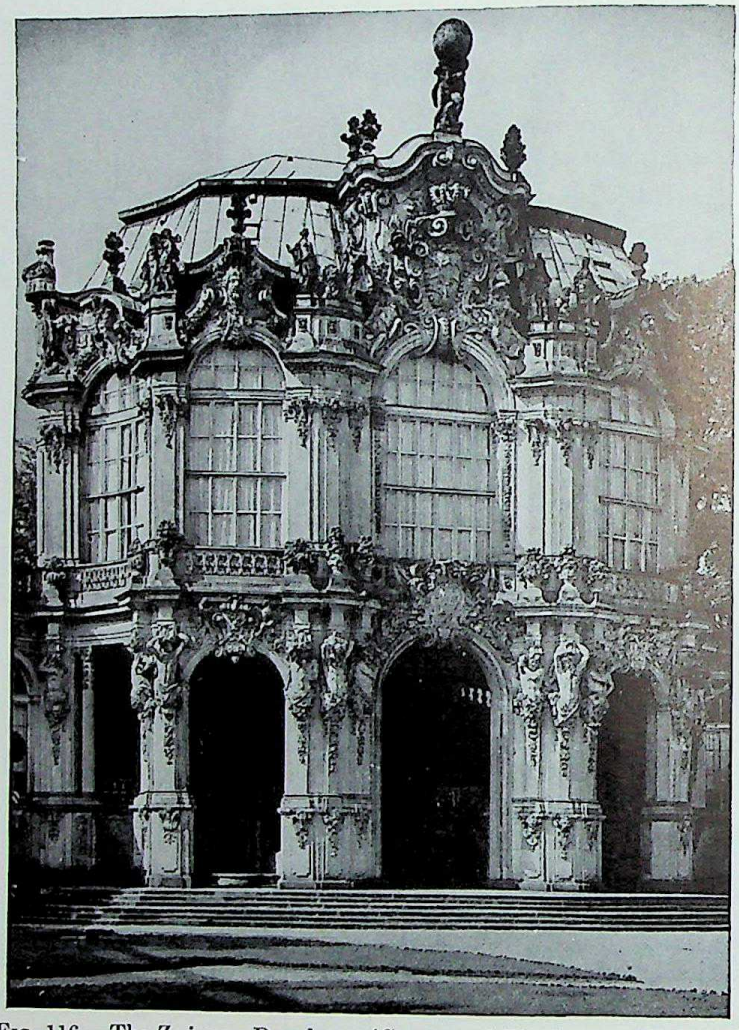


FIG. 116.—The Zwinger, Dresden. (*Courtesy of The German Railways.*)

Rococo art came to an end with the career of Jacques David (1748–1825). This period was marked by great advances in archaeological study, as we learn from the activities of Johann Winckelmann (1717–1768), described in the following chapter. David studied in Rome, became deeply versed in ancient history and mythology, and acquired extraordinary skill in composition and draftsmanship. Having profited

from a protracted sojourn in Italy and firsthand study of classical remains, David returned to France. Favored by Louis XVI, he at once became popular. French society, deceiving itself into believing it was living according to the ideas of ancient Greco-Roman life, was greatly pleased by his magnificent productions. "The Death of Socrates" on page 706 well illustrates David's rhetorical formalism.

But great changes were coming. The French Revolution, which began in 1789, overturned this parasitic and aristocratic society, deprived it of its property, and abrogated its privileges, thus putting an end to its artistic dreams. Even more far-reaching was the Romantic movement, which, rebelling against the formalism of the age, emphasized feeling, naturalism, and contemporary themes illustrating everyday life. Against such forces, the art of Boucher and David could not maintain itself.

That the Age of Reason was a significant period no one can deny. The problems and issues of the day were perceived with much clarity, and all possible use was made of the new scientific knowledge. This was a century of intense propaganda against ideas and customs. On the one hand, the age was extremely optimistic, believing it had discovered the secret of things. It was correspondingly pessimistic about such matters as religion. The philosophers and writers of the age often expressed themselves too simply. Men like Bayle, for example, did not, could not, or would not discriminate between age-old folklore and popular practices connected with it and the essential doctrines of the Christian religion. The controlling aristocratic influences of state, society, and church disregarded the rights, interests, and feelings of the lower classes. But the day of reckoning was at hand. A great change in industrial processes—the Industrial Revolution—was in the making. The French Revolution was about to begin. The Age of Reason was overwhelmed by the Romantic movement, a period of sentiment and emotion.

FOR FURTHER READING

DUNNING, W. A.: *A History of Political Theories from Luther to Montesquieu*

GEORGE, M. D.: *London Life in the Eighteenth Century*

GILSON, ÉTIENNE: *The Unity of Philosophical Experience*

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Chapter XLI

THE ROMANTIC AGE: LITERATURE AND ART TO 1848

The goal of all work on the lines of the historical method is not to set up theories or hypotheses but to arrive at scientific certainty.—Wilhelm Schmidt

SIGNIFICANT intellectual, artistic, and other changes were in store for the second half of the eighteenth century. The Age of Reason was coming to an end; a powerful reaction—the Romantic movement—was beginning. These cultural modifications were peculiarly complex; hence, no simple definition of the Romantic movement can be given.

The Romantic movement was a revolt against (1) the artificial and often superficial rationalistic thought built up during the eighteenth century; (2) the interest of the cultivated classes in Greco-Roman culture and the neglect of medieval and modern culture; (3) many of the social, moral, and religious customs of the age; and (4) absolute monarchical government. A movement so varied must be studied in detail before its import can be grasped. The first, second, and third aspects of the Romantic movement will be considered in the present chapter; the fourth, dealing with the great political and social revolutions from 1775 to 1848, will be discussed later.

Rousseau. Probably Jean Jacques Rousseau (1712–1778) exerted more influence in bringing about the Romantic movement than any other person. He was born of French parents who lived in Geneva, Switzerland. His formal education was neglected, and he seems to have had no compensating disciplines other than a mastery of music—more passionate than trained. He traveled widely, finding it difficult to settle down to the restraints of a regular life. Ever ready to assume responsibilities, he lacked the moral strength to discharge them. For example, he contracted an irregular union with a barmaid and, according to his own confession, sent his children to a foundling hospital.

Rousseau's books made a profound impression upon his contemporaries. All who in any way were dissatisfied with the conditions of the time read and approved them. The *Social Contract*, published in 1762, advanced a new theory of state and society and criticized current conceptions of politics. Rousseau thought that natural man, that is, man as he existed before society and social conventions appeared, was free, noble, and virtuous. Man's virtue and nobility degenerated as civilization advanced.

Hence Rousseau's statement: "Everything is good as it comes from the hands of the Author of Nature; but everything degenerates in the hands of man." Observing how men were ruled, he declared, "Man is born free, but everywhere he is in chains."

Rousseau believed it was possible for man to establish a just social order. He fancied that our early parents, "naturally" virtuous and noble, had come together as free beings and made a contract. This contract was the foundation of state and society. The "sovereign" thus created consisted in the individuals who constituted the state or,

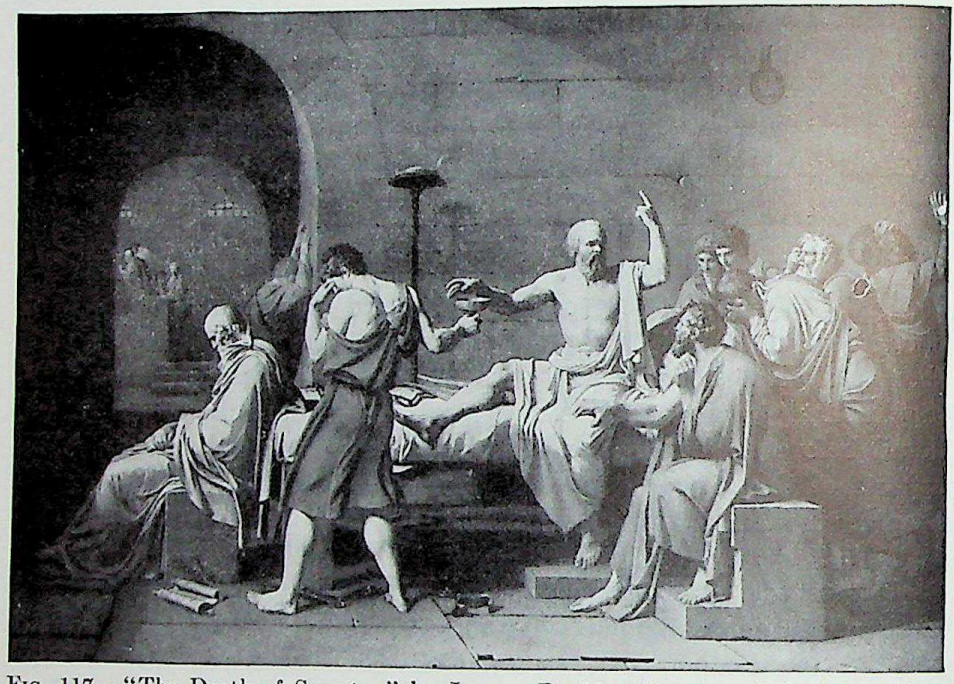


FIG. 117.—"The Death of Socrates," by Jacques David. (*Courtesy of the Metropolitan Museum of Art.*)

conversely, the "general will" of the individuals composing the state was the sovereign directing power in the state. Sovereign power did not reside in the government, whether monarchy or democracy. Individuals forming the state could modify its government as they saw fit. This flew directly in the fact of current theories that monarchies were established by divine right, which the people had no authority to change. The *Social Contract*, therefore, was a most revolutionary book.

The theory that man by nature is good and noble was further employed by Rousseau in an attack upon the educational ideas of the day. His *Émile*, published in 1762, became an educational classic. Rousseau outlined the education Émile should receive that he might grow up to be a good and noble man. He believed that children should

be treated as children and not as if they were miniature men and women. Children's minds were not to be stuffed with a multitude of facts of little significance. They should be led by reason to see the truth and importance of the things taught. Corporal discipline was not to be applied. Physical education should be stressed. A child should never be thwarted, nor should the principle of authority be invoked. "The caprice of children is never the work of nature but results from bad training," he declared. If a child, good and innocent at birth, were given the proper training, he would become a good and virtuous man. Exceedingly optimistic about the natural goodness of humanity, Rousseau believed that education could and would cure all ills.

Rousseau's *New Héloise,* published in 1761, is a novel in the form of letters, dealing with the love of a man of low social station for a girl of noble rank. According to Rousseau, the passion of lovers was natural and right, and the artificial barrier that made it impossible for people of different social position to marry was wrong. Julie finally married a man of respectable position while her lover suffered excruciating agonies. The lesson was obvious: nature was right and social conventions were wrong whenever they clashed with it. While the book overflowed with exaggerated sentiment, it eloquently spoke to a generation that had grown tired of the formalism and superficial optimism of the Age of Reason. Rousseau, with deep knowledge of the human heart, set the vogue for tearful sentimentality—one of the characteristics of the thought and letters of the Romantic movement.

Methodism. The Romantic movement assumed many forms. The Methodist revival in England may be regarded as one of its roots. The state church of England, the Anglican church, had lost its hold upon the poor and untutored masses in the cities and especially in the mining and industrial areas. Men and women were flocking to towns, where they lost contact with the church, as the overworked clergy were unable to cope with the numbers. In general, the clergy were appointed directly or indirectly to parishes by the squires, or landlords. Usually they were educated at Oxford or Cambridge and brought up as gentlemen. Bishops owed their appointment to political influence and all too often took a social or political view of their office. The dominant tone in the Anglican church was respectability and regard for tradition. Anglican clergymen showed little sympathy for religious enthusiasm and were prone to neglect the poor and unfortunate. Finding no comfort in its services, the lowly drifted away.

This situation cried for reform, and John Wesley (1703–1791), together with his brother Charles (1707–1788), led in the efforts to give the masses religious instruction. While at Oxford they consorted with the more serious-minded students; among these was George Whitefield (*d.* 1770),

who also played a part in the history of Methodism. Together they held religious exercises and were notably methodical in their devotions. "Here is a new set of Methodists springing up," said some of the mocking undergraduates. Their group was variously nicknamed the "Enthusiasts" and the "Bible Moths," but the name that endured was the "Holy Club." They practiced charity, gave alms to the poor, visited debtors in prison, and taught the illiterate to read devotional books.

Although the Wesley brothers began their ministry in the Anglican church, their sermons were direct and personal, addressed to the understanding of workingmen. Of John Wesley it was said that "he preached the love of God to man because his own heart was filled with a great love and pity for his sinning and suffering fellows." Between 1738 and 1790, he journeyed over 250,000 miles on horseback or by carriage. Meetings were held in fields and other open places, always enthusiastic and often tumultuous. People were profoundly moved by the religious vision they received. One person declared after he had listened to a sermon delivered by one of Wesley's ministers that he had been "brought out of darkness into marvelous light, out of miserable bondage into glorious liberty, out of the most bitter distress into unspeakable happiness." But such methods did not please the staid clergy. There was much opposition to the Wesleys, which sometimes degenerated into violence.

The Methodist movement lifted ignorant and exploited folk out of the narrow materialistic emptiness of their lives, giving them a sense of personal worth and dignity. Prayer meetings in which they murmured or shouted many a pious "Amen" became popular, and Bible reading assumed tremendous proportions. The singing of hymns was a chief feature of worship. Many new hymns were written and sung to lively, joyous tunes, a large number coming from the pen of Charles Wesley. The following is one of the more famous.

Come, thou almighty King,
Help us thy Name to sing,
  Help us to praise!
Father all-glorious
O'er all victorious,
Come and reign over us,
  Ancient of days! . . .

To thee, great One in Three,
Eternal praises be,
  Hence evermore;
Thy sovereign majesty
May we in glory see,
And to eternity
  Love and adore.

ENGLISH ROMANTIC POETRY. The Romantic movement, as has been mentioned, represented a revolt against an artificial attitude toward nature. As the aristocratic upper classes had no contact with the soil, never dirtied their hands in it or felt the pains of hard work, they knew nothing about nature. At best, they had only a superficial appreciation of nature's beauties. Small wonder that the Romantic movement meant a "return to nature." Rousseau had shown the way, but it was in England that poets made nature the chief theme of their verse. Thus James Thomson (1700–1748), a Scot, wrote *The Seasons*, in which each of the four seasons was described with much feeling. The following description of a storm is typical of the romantic conception of nature:

> Meantime the Mountain-Billows, to the Clouds
> In dreadful Tumult swell'd, Surge above Surge,
> Burst into Chaos with tremendous Roar,
> And anchor'd Navies from their Stations drive,
> Wild as the Winds across the howling Waste
> Of mighty Waters: now th' inflated Wave
> Straining they scale, and now impetuous shoot
> Into the secret Chambers of the Deep,
> The wintry *Baltick* thundering o'er their Head.

Often a melancholy note was combined with the poetic description of nature. Thomas Gray (1716–1771), an Englishman born in London, won fame by writing in this vein. His *Elegy Written in a Country Churchyard* is one of the first poems of the period to dwell on the thought of death, a theme that became immensely popular during the Romantic movement. Bryant's *Thanatopsis* and Tennyson's *In Memoriam* were written in a similar melancholy tone. The following stanzas of the *Elegy* illustrate this mournful sentiment.

> Beneath those rugged elms, that yew-tree's shade,
> Where heaves the turf in many a mould'ring heap,
> Each in his narrow cell for ever laid,
> The rude forefathers of the hamlet sleep . . . .
>
> Perhaps in this neglected spot is laid
> Some heart once pregnant with celestial fire;
> Hands, that the rod of empire might have sway'd,
> Or waked to ecstasy the living lyre . . . .

Other British poets wrote about nature, combining reflections upon its beauty with sorrowful thoughts or moods of delight. Robert Burns (1759–1796), who spent his all too brief life in Scotland writing about Scottish life and nature, expressed his feelings in the following stanzas:

Ye banks and braes o' bonnie Doon
How can ye blume sae fair!
How can ye chant, ye little birds,
And I sae fu' o' care!

Thou'lt break my heart, thou bonnie bird
That sings upon the bough;
Thou minds me o' the happy days
When my fause luve was true.

To Spring by William Blake (1757–1827) opens with the following verses:

O Thou with dewy locks, who lookest down
Through the clear windows of the morning, turn
Thine angel eyes upon our western isle,
Which in full choir hails thy approach, O Spring!

WORDSWORTH. Of all the English poets of the Romantic movement, no other can equal William Wordsworth (1770–1850). His emotionalism, love of nature, and poetic imagery marked a turning point in the interests and understanding of Englishmen. Born in Cumberland, a county on the west coast of England noted for its quiet scenery of lake and wood, Wordsworth had ample opportunity to become acquainted with the beauties of nature. He was the first of the "Lake poets" to celebrate the charms of the Lake District. Wordsworth, like Rousseau, believed that nature was good and pure while human conventions were mainly responsible for the ills of society.

As a youth, Wordsworth hopefully looked for the birth of a utopia. He was in his twentieth year when the French Revolution stimulated his optimism and idealism. At last the fetters of tyranny were burst asunder! His enthusiasm was much like that of the youth of our own day for the communist revolution in Russia. In *The Prelude*, one of the finest of autobiographical poems and a most important document illustrating the Romantic movement, Wordsworth wrote as follows of the hope everywhere inspired by the revolution in France:

Bliss was it in that dawn to be alive
But to be young was very Heaven! O times,
In which the meagre, stale, forbidding ways
Of custom, law, and statute, took at once
The attraction of a country in romance!

The faith and trust he had felt in the good to come is expressed as follows:

That a benignant spirit was abroad
Which might not be withstood, that poverty
Abject as this would in a little time
Be found no more, that we should see the earth
Unthwarted in her wish to recompense
The meek, the lowly, patient child of toil.
All institutes for ever blotted out
That legalized exclusion, empty pomp
Abolished, sensual state and cruel power
Whether by edict of the one or few;
And finally, as sum and crown of all,
Should see the people having a strong hand
In framing their own laws; whence better days
To all mankind.

His hopes, however, were dashed when Napoleon's tyranny reduced France to obedience.

. . . If I suffered grief
For ill-requited France, by many deemed
A trifler only in her proudest day;
Have been distressed to think of what she once
Promised, now is; a far more sober cause
Thine eyes must see of sorrow in a land,
To the reanimating influence lost
Of memory, to virtue lost and hope,
Though with the wreck of loftier years bestrewn.

The Excursion, another autobiographical poem, illustrates his passion for traveling afoot, ever enjoying the beauties of nature. But it is in his brief poems that the reader finds some of the finest expression of Wordsworth's feeling toward nature.

I wandered lonely as a cloud
That floats on high o'er vales and hills,
When all at once I saw a crowd,
A host, of golden daffodils,
Beside the lake, beneath the trees,
Fluttering and dancing in the breeze.

The sight of a rainbow produced a poem that has ever been a prime favorite.

My heart leaps up when I behold
A rainbow in the sky:
So was it when my life began,
So is it now I am a man,

So be it when I shall grow old
Or let me die!
The Child is father of the Man:
And I could wish my days to be
Bound each to each by natural piety.

BYRON, SHELLEY, AND KEATS. Byron (1788–1824), a leading exponent of romantic sentiment, deeply loved nature; his verse is filled with a peculiarly melancholic spirit that reminds one of Rousseau's *New Héloise*. Byron possessed immense energy but, like Rousseau, was quite undisciplined. The fact that he was a cripple embittered him. Estranged from his wife and guilty of many indiscretions, he became the subject of scandalous gossip and had to leave England for a prolonged period. He was haughty, sensitive, and morbidly emotional, chafed under restraint, and never was master of himself. His poetry breathes a fervent passion arising from these characteristics. Ever in rebellion, he hated hypocrisy and could not overlook the shortcomings natural in his fellowman. He was keenly interested in the revolt of the Greeks against their Turkish oppressors and for their cause conceived a romantic enthusiasm. He gave freely of his money to support their struggle for independence, even served in the war, and died at Missolonghi. Byron was a tumultuous individualist, a true son of the Romantic movement. Idealized by the youth of Europe, he exerted an influence that spread far and wide in the decade after 1820.

Percy Bysshe Shelley (1792–1822), a highly sensitive person, early felt the romantic spirit of revolt. Love of liberty and fierce hatred of oppressive institutions made him a true son of the Romantic movement. *To a Skylark* is one of his best lyrics. His *Mask of Anarchy*, inspired by the killing of innocent men in the Peterloo Massacre of 1819, is a severe arraignment of social injustice. The poet dreamed he saw Anarchy, a stark figure, and Murder, Fraud, and Hypocrisy doing obeisance to him. Anarchy went through the land, receiving the support of law and religion.

Lawyers and priests, a motley crowd,
To the earth their pale brows bowed;
Like a bad prayer not over loud,
Whispering—"Thou art Law and God."

Shelley urges the people to shake off the shackles of tyranny.

Rise like lions after slumber
In unvanquishable number!
Shake your chains to earth, like dew
Which in sleep had fallen on you—
Ye are many, they are few!

Though John Keats (1795–1821) died from tuberculosis at the age of twenty-five, he won immortal fame. He was extremely sensitive to beauty in all its forms, and religion appealed to him because of its aesthetic possibilities. A morbid melancholy and pessimism mark his poetry. He found his deepest inspiration in the characters and tales of Greek poetry, which he retranslated in his own poems. In his *Endymion*, a romance that reveals his aesthetic preoccupation, the opening line states his passion for beauty, probably as clearly as any of his verses.

> A thing of beauty is a joy for ever:
> Its loveliness increases; it will never
> Pass into nothingness; but still will keep
> A bower quiet for us, and a sleep
> Full of sweet dreams, and health, and quiet breathing.
> Therefore, on every morrow, are we wreathing
> A flowery band to bind us to the earth, ...

Keats's many followers in England admired his sensitivity to beauty, and the Pre-Raphaelite painters claimed him as their spiritual parent.

Revival of Interest in the Middle Ages and in Primitive Culture. During the Romantic Age there was a revival of interest in the Middle Ages, which since the Renaissance and Reformation had been ignored or discredited. Scholars of the Renaissance disliked medieval culture because it was so unlike the civilization of classical Greece and Rome. Protestants disliked it because it was inspired by Catholic Christianity. Rationalists, following Bayle and Voltaire, hated it for the same reasons, and with a special contempt for any culture based on revealed religion. These prejudices gave rise to an excessive adoration of Greek and Roman culture as a permanent norm of civilization. As the Romantic movement was a revolt against classical ideas, it was natural that the rebels of the new age should find much that was good and beautiful in medieval culture.

Besides finding inspiration in medieval culture, romantically inclined poets turned to what they thought was the period of man's earliest history. Like Rousseau, they believed that men in their first state were naturally good and that the art and literature of primitive times possessed higher excellence than the precise literature of the eighteenth century. Hence, an eager reception awaited the work of James Macpherson (*d.* 1796), a Scot who had all his life listened to the tales of Scottish peasants. Fired by what he heard, he wrote *Poems of Ossian*, passing it off as a translation of a work of the third century A.D. However, it obviously is a typical conceit of Romanticism.

I sit in my grief; I wait for morning in my tears! Rear the tomb, ye friends of the dead. Close it not till Colma come. My life flies away like a dream: why should I stay behind? Here shall I rest with my friends by the stream of the sounding rock. When night comes on the hill, when the loud winds arise; my ghost shall stand in the blast and mourn the death of my friends.

This emotional poem attracted universal attention, particularly in Germany. To all who were influenced by Rousseau's doctrines about the natural goodness of mankind, it seemed to exemplify the purity and perfection of man's first state.

Most widely influential of the English writers of the Romantic movement who stimulated a growing zeal for the Middle Ages was Sir Walter Scott (*d.* 1832). He wrote *Marmion* and *The Lady of the Lake*, two poems of the romantic imagination. Then he turned his attention to the writing of novels, creating a type of tale that was universally admired and imitated. The earlier years of a country's history inevitably stirred the imagination of the Romantic Age, and Scott's most popular and successful novels were thus *Ivanhoe*, *The Talisman*, and *Quentin Durward*. The first two romances dealt with the Crusades, the third with the reign of Louis XI (*d.* 1483). The glamour that such tales cast over the Middle Ages was a potent influence in reviving interest in medieval civilization.

Romanticism in Germany. So great a force was the Romantic movement that it transformed the intellectual and political life of Germany. Few countries had suffered such national tragedies. The Thirty Years' War (1618–1648) had ruined Germany's economic welfare, and the Treaty of Westphalia, which concluded the war, destroyed all political unity. The armies of Louis XIV camped on its soil, laying waste its cities and countryside. National life was impossible; few princes were able to govern effectively. Commerce was stagnant, art and literature made little progress, and German achievements seemed provincial as compared with those of France and England. The intellectual world paid little attention to German thought and scholarship; the German language was rarely studied. But by 1750 the Germans had become restive. They woke from their lethargy when the Romantic movement began to be felt.

Lessing. Among the first to break with the old ways was the poet and critic Gotthold Lessing (1729–1781). Born in Saxony and brought up as a Lutheran, Lessing received the customary education in Greek, Latin, mathematics, and natural philosophy. He early showed keen interest in the theater and even played dramatic parts but later devoted himself to writing plays, critical essays, and poems. He rendered heroic service in destroying the vogue for classical plays constantly presented to the German people, patterned after Racine and Corneille, and filled with characters bearing classical or French names. Such plays bore

no vital relation to German life, and Lessing protested against this debasement.

> What a simple idea to give the Germans a national theater while we Germans are as yet no nation! I do not speak of the political constitution but only of moral character. One might almost say: the character of the Germans is to insist on having none of their own. We are still the sworn imitators of everything foreign, especially the humble admirers of the never enough admired Frenchmen. Everything from beyond the Rhine is beautiful, charming, lovely, divine; we would rather disown sight and hearing than think otherwise; we rather persuade ourselves to accept coarseness for naturalness, frivolity for grace, grimace for expression, a tingling of rhymes for poetry, howling for music, than in the smallest degree doubt the superiority in all that is good and beautiful and sublime and becoming, which this charming nation, this first nation of the world, as it is accustomed to call itself, has received as its share from a just Providence.

Expressing his conception of art in *Laokoon*, Lessing stated that art must be true to nature, must have intimate contact with life, and must spring naturally from it. The mere following of formal rules such as the unities of time, place, and action enforced in French and classical plays was insufficient. Lessing admired Shakespeare, whose works illustrated his own ideas about art; this view was shared by later writers because his plays helped them to break with the dead classical tradition. From its title, it is obvious that *Laokoon* was inspired by classical Greek and Roman ideas. But Lessing's admiration for classical culture was something very different from that of the age of Louis XIV and the Age of Reason. Lessing believed that the art and literature of the Greeks and Romans were a living part of classical culture, not a mere collection of eternally valid artistic rules. The poetry of Homer and Vergil, he felt, was as naturally related to classical society as that of Shakespeare to the Elizabethan Age.

Lessing acquired his conception of Greek and Roman art from the work of Johann Winckelmann (1717–1768), a German archaeologist who spent many years in Rome. As secretary to several Roman cardinals, he had the opportunity to study the monuments in Rome and became interested in the archaeological remains at Pompeii and Herculaneum, which were being excavated from the volcanic ash and lava that had overwhelmed them in 79 A.D. His epochal *Thoughts concerning the Imitation of Greek Works of Art* presents a glowing picture of the entire culture of the Greeks—political, social, and intellectual. Winckelmann held that the Greek artist drew his materials and motives from his own culture. Combining them imaginatively, he created an ideal type of noble simplicity, calm greatness, and fine proportion. Actually, Winckelmann's understanding and appreciation of classical art were far more profound than

those of the enthusiasts of the Italian Renaissance. Yet, judged from the present-day standpoint, his scholarship was defective. For example, he was not able to distinguish between the various schools of Greek and Roman art. But Winckelmann's influence helped Lessing to form a more vital conception of literature and gave a mighty impulse to the science of archaeology, the rise of which will be discussed in a later chapter.

Having thus broken with the false artistic and literary conceptions common in Germany, Lessing produced *Minna von Barnhelm* in 1767, the first genuinely national German play. Its characters were German, its scenes were laid in Germany, and the problems presented were common in Germany shortly after the Seven Years' War (1756–1763). The play stirred German national pride by introducing a ridiculous French character in contrast with the heroine Minna, a woman of high qualities, and the hero, the embodiment of German ideas of national honor.

Goethe and the Weimar Group. Rousseau's ideas were spreading throughout Germany. *Emile*, *The New Héloise*, and his *Confessions* were read everywhere, and the revolutionary spirit made a tremendous appeal to young people who felt the awakening forces pulsating in German life. The cult of nature, admiration for the life and thought of simple people, excessive emotion, boundless individualism, and dislike for social convention characterized this revolt. This period in the art, literature, and life of Germany is known as *Sturm und Drang*, or "storm and stress."

Its most original genius was Johann Wolfgang von Goethe (1749–1832). Born in Frankfurt, he studied law at Leipzig and Strasbourg and in 1775 went to Weimar by invitation of the duke to assume the post of privy councilor. He became an important servant, helping in the management of the ducal education, and taking over the direction of the theater. Court life at Weimar was shot through and through with the ideas of the storm and stress period; everyone embraced the new cult of nature and the simple life. People tried to harden themselves by living in the open air, taking long walks and rides, forming nightly skating parties, and indulging in the chase. They went into the country and danced with the peasant youth, thus giving testimony to their belief in the goodness of untutored man and woman. All this seems tame enough to us of the present day; but it was revolutionary in 1775, when such activities were radically opposed to the conventionality of court society.

Goethe's first work was a play, *Götz von Berlichingen* (1773), named after its leading character, a robber knight of the days of Martin Luther. Its theme endeared it to the youth of the storm and stress period, for Götz was an energetic man who hated priests and princes but was a friend of the oppressed. It was a stormy play, tumultuous in action, disregarding the classical unities of time, place, and action. More important was *The Sorrows of Young Werther*, which appeared in 1774. Written in the form

of letters and inspired by Rousseau's *New Héloise*, this novel was based in part upon Goethe's own experiences. It is a story of unhappy love and suicide, characterized by extreme sentimentality. Like Rousseau's novel, it displayed profound insight into human emotion and became a favorite with the young people of the storm and stress period, who, believing themselves in revolt against social conventions, wept heartily with Werther.

One of the most versatile men who ever lived, Goethe possessed profundity of feeling, clear insight, and a mastery over words. Quick and vivacious, his inquisitive mind never tired. At Weimar, he learned much from routine work in connection with government. His delight in nature caused him to take keen interest in wood, garden, and field. He studied mineralogy because the duke of Weimar owned some mines; he studied plants and animals and speculated on organic evolution; he also did some work in physics, but his slight knowledge of mathematics prevented him from making much progress in this subject. He developed a theory of color and made a number of contributions to the study of optics, a branch of physics. But wide as the range of his interests was and energetically as he might study, he never became a Leonardo da Vinci. One reason, no doubt, was that since Leonardo's day science had made marvelous progress and by 1800 had become too extensive for one man to embrace all of it. The day of the encyclopedic scholar had passed forever. Further, Goethe was not adapted to be a scientist; he did not have the patience necessary for an investigator. "Distinguishing and counting did not lie in my nature," he said.

Goethe's storm and stress period came to an end with his visit to Italy from 1786 to 1788, which gave him an opportunity to see a new country and study at first hand its art. His inquisitive mind and artistic eye became acquainted with a world far different from that of his storm and stress contemporaries in Germany. He became enamored of the art of the late Italian Renaissance, especially the works of Raphael, Michelangelo, the Carracci, and Guido Reni. These artists accordingly became popular during the next two generations, to the unfortunate neglect of the Renaissance before Raphael. On returning to Weimar, Goethe formed a strong dislike for the excesses of his storm and stress days. Rebelling against exaggerated Romanticism, he turned to Lessing's *Laokoon* and began to comprehend the vitality of Greek poetic forms. He no longer wrote unconventional plays like *Götz von Berlichingen* with its tumultuous action and formless plot but produced *Iphigenia in Tauris* in the clear and precise manner of Greek tragedians. Thus he came to appreciate the great classical tradition of dramatic composition with its unities of time, place, and action. Interest in classical, especially Greek, art was not uncommon during the Romantic Movement. Many poets and artists were entranced with the haunting beauty of Greek forms. It is sufficient

to recall Byron, Shelley, and Keats in England and the painter David in France.

Faust, a tragedy of diverse elements many of which are autobiographical, is Goethe's greatest literary production. Its central theme is the conflict in Faust between his higher and lower self, the latter being suggested by his evil spiritual double, the fiend Mephistopheles. "Two souls are striving in my breast, each longing to be free of the other," says Faust. Only the faintest idea can be given here of the richness, depth, and variety of this great dramatic poem. The diction is magnificent, and the episodes are set forth with extraordinary profundity of feeling and insight. Among its great characters are Faust, who typifies man in his search for knowledge in order to understand and control nature; Mephistopheles, a base villain who ever seeks to draw man from his lofty purpose; and the pedantic Wagner, who signifies those human beings who are quite satisfied with the appearance of things and to whom wisdom consists in learning a multitude of facts.

Especially poignant are the scenes presenting Margaret. She is instinctively repelled by the base Mephistopheles, of whom she speaks as follows to Faust:

> The man who with thee goes, thy mate,
> Within my deepest, inmost soul I hate.
> In all my life there's nothing
> Has given my heart so keen a pang of loathing
> As his repulsive face has done.

She is betrayed by Faust and is put in prison for killing her illegitimate child rather than face a critical world. Faust comes to her cell to save her from the executioner's sword. She is overcome with joy on seeing him.

> Thou comest to save me,
> And I am saved!
> Again the street I see
> Where first I looked on thee;
> And the garden, brightly blooming,
> Where I and Martha wait thy coming.

But, overwhelmed by her sense of guilt, Margaret realizes that, even if freed from prison and saved from the block, she cannot recover her innocence. She appeals to heaven.

> Thine am I, Father! rescue me!
> Ye angels, holy cohorts, guard me,
> Camp around and from evil ward me!
> Henry! I shudder to think of thee.

"She is judged," remarks Mephistopheles hypocritically. But a voice from heaven exclaims, "She is saved." Through her suffering, Margaret has done penance for her sins.

Goethe's name is linked with that of Schiller (1759–1805), also a poet of the first order. Brought up in poverty, Schiller struggled hard for an opportunity to study and write. Disliking law, he turned to medicine and became a regimental surgeon. These were the years of the storm and stress revolt, and Schiller threw himself into the movement heart and soul. He wrote *The Robbers*, a play expressing intense craving for negative liberty, clearly a work of youthful exuberance. Deserting his regiment to view the play's performance, he was placed in the guardhouse. He escaped and wandered from place to place, suffering much hardship until Goethe secured for him an appointment as professor of history at the University of Weimar. Schiller worked hard, for he had never prepared himself for the serious teaching of history, and this new task was to have a profound influence upon his future writings. More and more they assumed a political character. The setting and characters of such plays as *Wallenstein*, *Don Carlos*, and *The Maid of Orleans* are drawn from history, though Schiller took the utmost liberty with the characters.

Schiller's original ideal was to transform the theater into a vehicle of high moral instruction. At this time, Napoleon was extending his military despotism over Germany. The servile condition of the country roused the patriotic Schiller like a clarion call to revolt. He stated his ideas on patriotism and liberty in the eloquent play *William Tell*. Stauffacher, one of its characters, makes the following speech in behalf of German freedom.

> The land is ours; it is our own creation!
> By our own labor those old gloomy forests
> That once were lairs for wolves and bears were felled
> To make space for our homesteads, and the brood
> Of the old dragons that among the swamps
> Lurked, or, with venom swollen, issued forth
> For prey, were all destroyed; the dense grey fogs
> That hung o'er fenny pastures were dispersed!
> The rocks were rent asunder; over chasms
> Were flung these bridges to make safe the way
> For passengers;—ay, by a thousand claims,
> The land is ours forever!—Shall we bear it
> That this, the creature of a foreign lord,
> Shall here insult us on our own free soil?
> Is there no help for us? Must we bear this?

Hearing these passionate words, Stauffacher's audience is ready to rise in rebellion. Stauffacher continues as follows:

NO!—there's a limit to the tyrant's power.
When men, oppressed, can find no aid on earth,
To rid them of their burden, then they rise;
The people rise; they stretch their hands to heaven,
And hence fetch down their old eternal rights;
Their rights, all—like the everlasting lights
There shining in the heavens—unchangeable,
Imperishable as the stars themselves.
Then nature's own primeval rule returns;
Man stands in battle, ready for the foe.
'T is our last means; but, when all others fail,
We draw the sword! The best of all life's boons
We will defend!—In front of this our land
And of our wives and children, here we stand!

This drama met with instantaneous approval. But Schiller did not live long to enjoy his success; for, suffering from tuberculosis, he died in 1805. His influence was enormous during the succeeding decades because his dramas preached a fervent nationalism, crystallizing the demand for German national unity.

Another noteworthy personage belonging to the Weimar group was Johann von Herder (1744–1803). His youth was one of poverty and hardship, but he was nevertheless able to study at the University of Königsberg. He became a Lutheran minister and in 1776 was invited to become chief pastor at Weimar. Someone has called Herder "the gatekeeper of the nineteenth century" because he initiated many influential ideas. Like the followers of the rationalist school of thought that sprang up after Descartes, Herder was a deist but early felt the invigorating spirit of the Romantic Movement. He evolved some remarkable ideas about mankind and its civilization. He believed that man was steadily undergoing a kind of educative process whereby he finally would arrive at a perfect ideal of humanity. History, literature, art, and religion were aspects of this process, which Herder believed was evolutionary. Progress toward the pure and final ideal could be traced chiefly in the development of art, literature, philosophy, and religion rather than in the story of wars and the recital of dynasties. To trace the development of culture from earliest times became a task that Herder embraced with ardor. Like Rousseau, he dreamed about the natural goodness of man's early parents, who had produced the finest art. Hence, Herder studied the Hebrew poets, the Scandinavian sagas, and the early Germanic poems. He helped to revive the study of early national literatures and encouraged the sentiment of nationalism.

GERMAN CRITICISM. Two critics who discussed the ideas and productions of the Romantic Movement were the brothers August (1767–

1849) and Friedrich (1772–1825) von Schlegel. August von Schlegel made a profound study of Shakespeare, who had never been appreciated during the rationalist generations before the Romantic Movement. Writers and admirers of literature preferred poetry like Pope's and plays like Racine's to the supposedly uncouth productions of Shakespeare. But the new age admired the profound psychology of *King Lear*, *Macbeth*, and *Hamlet*. August von Schlegel translated seventeen of Shakespeare's plays. Although his rendering was not always exact, he caught the spirit of the master and something of the Elizabethan atmosphere.

Friedrich von Schlegel, on the other hand, was less of a poet and more of a scholar. He wrote on all sorts of topics, treating everything from the standpoint of the Romantic Movement. He published essays on Greek and Roman literature. His *Language and Wisdom of the Hindus* (1808) was the starting point of the study of Hindu philology and scientific interest in comparative philology.

GERMAN PHILOSOPHY. Germany at this time produced a school of philosophers whose thought proved revolutionary. They broke with rationalists like Descartes, Locke, Voltaire, Berkeley, and Hume. The discussion of Hume in Chap. XL showed how philosophic rationalism had developed into thorough skepticism. Mental phenomena had been reduced to mere sensations, and consequently the existence of such a thing as mind was denied. If mind did not exist, there were no real grounds for inferring such things as cause. Thus psychology explained away causality.

This train of reasoning was regarded as a serious error by Immanuel Kant (1724–1804), a philosopher who lived quietly in Königsberg. Destruction of the philosophical belief in causality also destroyed the idea of efficient causes and of God as Final Cause. It seemed to Kant that the refutation of the idea of a Final Cause deprived morals of a sound foundation. How to provide a sure basis for moral duty without such foundation was a problem. Was it possible to establish it upon the metaphysics of the new natural sciences?

Kant wrote at length upon this subject, producing a number of abstruse philosophical treatises, the chief being the *Critique of Pure Reason*. His solution is characteristic of the idealistic philosophers of the succeeding century and is as follows: Thinking that he could not by any process of reasoning show that God existed, Kant believed it was impossible to find any firm basis for moral obligation. Nevertheless, moral obligation is a universal rule among men, and so we must infer, even if we cannot prove it, the existence of God. This reasoning also applies to such ideas as immortality and freedom of the will. "Act so that men may induce from your example a universal rule of action" summarizes Kant's ethics. The old view was that men believe in moral obligation

because it is the will of God. Kant's view was that we believe in God because it is morally necessary to do so. Kant exerted an enormous influence, especially in the break with the old rationalism. His emphasis upon will, morals, and belief united him with the emotionalism of the Romantic Movement.

Kant's philosophic teachings were considerably modified by Johann Fichte (1762–1814). He became professor of philosophy at the University of Jena but was dismissed when it was rumored that his philosophy was pantheistic. From there he went to the University of Berlin, where he became the first rector in 1810. Fichte began with the idealism of Kant but added to this a universal "Ego," or God. The Ego acts constantly and so becomes consciousness, knowledge, the world of phenomena. It expresses itself in the following three ways: (1) *Thesis*, the eternal Ego itself. (2) *Antithesis*, the Ego creating the objects represented to us by our mind and senses. These objects are the non-Ego, opposed to the Ego. (3) *Synthesis*, the resultant limitation of the Ego by the non-Ego and of the non-Ego by the Ego. Since the Ego, or God, is conceived as being creative self-activity, it follows that struggle is a law of life, the basis of morality. Fichte's philosophy obviously was one of action. It therefore was a fitting philosophy for the Romantic Movement, especially during the days of Napoleonic despotism, when Fichte took an active part in stimulating the patriotism of Germans. He, too, was one of the fathers of German nationalism.

The greatest of Kant's and Fichte's followers was Georg Wilhelm Hegel (1770–1831). He became a professor at the University of Jena and finally went to Berlin, where he wrote many books. Following in the footsteps of Fichte, he asserted that Spirit, Idea, or God expresses itself in the world as we know it. This expression of self by the Spirit, Idea, or God is accomplished in a fixed succession as follows: (1) thesis, (2) antithesis, and (3) synthesis. Hegel's thought is very involved. Beginners, and even some of the best philosophers, have difficulty in following it. But it is of the greatest importance to grasp at least the basic facts just presented.

Hegel exerted a vast influence on all who were interested in the philosophy of history. His *Lectures on the Philosophy of History* colored conceptions of history throughout the past century. Since Spirit, Idea, or God expresses itself according to a rigid law by *thesis*, *antithesis*, and *synthesis*, the history of mankind illustrates the Spirit constantly expressing itself. There are three stages, as follows: (1) Oriental monarchies, which are despotic; this stage represents the *thesis*. (2) The Greek republics, which are characterized by democracy and demagogic rule; this is the opposite of the *thesis* and represents the *antithesis*. (3) The parliamentary monarchy, which represents a *synthesis* of former

tendencies. We shall see when dealing with Ludwig Feuerbach and Karl Marx how vast Hegel's influence became. Thinkers have made the most varied use of his ideas, often in ways Hegel would have disapproved.

Reform of Elementary Education. The momentous developments in thought during the Romantic Age also affected ideas about education. We have seen how Rousseau, believing in the natural goodness of man, held that the right kind of training would produce the right kind of man. This and similar ideas were applied in practical teaching by the Swiss Johann Pestalozzi (1745–1827). Born in utter poverty, this noble-minded man endeavored to become a philanthropist. His first venture was to start a garden near Zurich in which he hoped to grow improved varieties of vegetables. He expected to succeed because he knew about better strains of seeds and planned to utilize the large quantities of stable manure going to waste, but his efforts miscarried.

Pestalozzi next became interested in the education of his son, whom he sought to bring up according to the advice Rousseau gave in *Emile*. Pestalozzi's significance as an educator lies in the fact that he shaped his method of education to the character of children. "He understood thoroughly what most masters were entirely ignorant of: the mind of man and the laws of development, human affections, and the art of arousing and ennobling them. He seemed to have an intuitive insight into the development of human nature, which indeed he was never tired of contemplating," wrote one of his admirers. Loving his pupils, Pestalozzi was especially concerned over the waifs and orphans. He washed, clothed, and fed them; and the school that he established amid great hardship at Yverdun became famous. He appealed to the senses, thus making his teaching concrete. All learning was to proceed by natural steps; there was to be no stuffing of the mind with a multitude of facts that had no meaning. Education embraced mental, moral, and physical development. Teachers were to regard the pupil's individuality as inviolable; corporal punishment was reduced to a minimum. A radical improvement on the practices of the day in elementary education, Pestalozzi's natural methods were copied widely, especially in Prussia and America.

Romanticism and Music. Since the days of Handel (*d.* 1759), music had been the most popular form of art in Germany. The vogue for music was intensified during the Romantic Movement, which championed revolt against old ideas, preached liberty, and exalted music above the place it had occupied in the Age of Reason. The early life of Ludwig van Beethoven (1770–1827) was a hard struggle with poverty. Taught by his father, he later received lessons from Haydn and Mozart, whose music belonged to the period that closed with the advent of Romanticism. Like

other artists of the period, Beethoven felt an irresistible urge to express his thoughts and feelings. He so transformed the traditional sonata that it became a perfect vehicle for the subjective feelings which characterized the Romantic Movement. The *Third Symphony* expresses a romantic idealization of Napoleon. His *Fifth Symphony* throbs with the romantic passion of growing German nationalism. After Napoleon's overthrow, Beethoven celebrated the liberation of Germany in his *Seventh Symphony*. The great master also wrote other forms of musical composition, each of which is instinct with romantic feeling and sentiment.

Franz Schubert (1797–1828) of Vienna lived only a short time, like his romantic contemporaries, Byron, Shelley, and Keats. Nevertheless, he produced an amazing amount of music—650 songs, 10 symphonies, and other pieces all possessing a striking dramatic spirit and melodic fertility. Karl von Weber (1786–1826) wrote a cantata called *War and Victory* that celebrated the overthrow of Napoleon. Felix Mendelssohn (1809–1847), another true child of the Romantic Movement in Germany, became immensely popular among the Germans steeped in romantic thought and sentiment. When only seventeen, he wrote his justly famous overture *Midsummer Night's Dream*, based upon Shakespeare's play.

Romanticism in Painting. The Romantic Movement also witnessed a revolt among painters against formalism and the excessive use of Greek and Roman themes. No longer willing to serve aristocratic tastes and institutions, painters were more and more influenced by the ideas that Rousseau had expressed about natural man. Commonplace themes, scenes of nature and toiling humanity, became popular. Sentiment was emphasized, and artists stressed the patriotic note. No painter of this period surpassed the Spaniard Francisco Goya (1746–1828). He was born of peasant stock, had a strong sense of realities, and readily saw through the empty pomp of the absolute monarchy of Spain. He hated the aristocracy and the clergy of the church, which was all too much the servant of crown and nobility. Court painter under Charles IV, an incompetent king who ruled from 1788 to 1808, Goya took advantage of his rare opportunity to reveal the hypocrisies of that monarch and of the people who formed his court. His "King Charles IV on Horseback" is decidedly satirical. But Goya's connection with the main currents of his time is clearest in the pictures that show the ghastly execution of rebels in the days of Napoleon's domination of Spain. The emotion in these definitely links Goya with the rising tide of nationalism, which swept over Europe between 1800 and 1820.

But it was England that led the way in romantic painting. It was natural that the country which produced nature poets like Wordsworth should also bring forth a school of nature painters. John Constable (1776–1837) worked in the open air, painting scenes directly from nature

and using colors that reproduced those of natural objects. Painters before him had executed their works in studios, and their results lacked the freshness of wood, brook, and meadow. Constable studied cloud effects most successfully. His pictures were immensely popular in an age when people were avidly reading the Lake poets. His "Salisbury Cathedral from the Meadows" (1831) justly became a favorite. Constable has properly been compared with Wordsworth.

Joseph Turner (1775–1851) became even more famous than Constable. He showed great ability in painting the color of sky and setting sun. The most important colorist of the Romantic Age, he led the way to subsequent experimentation in light and color. He liked to paint Venetian

FIG. 118.—"Riverside," by Daubigny. (*Courtesy of the Metropolitan Museum of Art.*)

scenes; to him, Venice was "a city of rose and white, rising out of an emerald sea against a sky of sapphire blue." But he also painted seascapes and rural English scenes.

In France, painters were slow to succumb to the influence of Romanticism. Artists like David continued to use Greek and Renaissance themes. But the patriotic note could not be withstood, and Ferdinand Delacroix (1798–1863), objecting to the coldly academic methods of his contemporaries, began to paint such pictures as the "Wounded Cuirassier." He was the most widely influential of artists who broke with classical conventionalism. Influenced by Byron and Constable, he liked living beings, refused to paint nymphs and goddesses, and instead portrayed scenes from Dante and Byron and events of the Revolution of 1830 and the Greek Revolution. Delacroix became the forerunner of an influential

school of painters who specialized in patriotic military themes for public buildings. This nationalistic and sentimental school of art has continued in popularity to our own times.

A unique and widely influential group of French nature painters finally appeared—the Barbizon school, composed of artists who drew their inspiration from commonplace things. Jean François Millet (1814–1875) is one of the best known of this group. He was an intense Catholic, with heart aglow for the faith of his fathers and a deep love for simple, homely scenes. His "Sower," "Shepherdess," "Sheep Shearing," "Going to Work," "Angelus," "Man with the Hoe," and "Gleaners" exemplify the new interest in the life of the common man. Jean Baptiste Corot (1796–1875) portrayed sunny landscapes with trees, poetically rendered. Charles Daubigny (1817–1878) was most successful with landscapes in which streams and millponds reflect trees, shrubs, and gently rolling countryside. Théodore Rousseau (1812–1867) was the greatest master of landscape of the entire Barbizon school if not of the nineteenth century. All in all, the Barbizon group of painters were the most significant exponents of the love of nature and dislike for convention that glowed so warmly in the breasts of the men and women of the Romantic Age, who in the exuberance of their imagination and sentimental affection for nature and humanity turned their backs upon the all too formal and superficial aspects of the life and thought of the Enlightenment.

FOR FURTHER READING

ARTZ, F. B.: *France under the Bourbon Restoration*, 1814–1830, Chap. V
CAFFIN, C. H.: *The Story of Spanish Painting*
EDWARDS, MALDWYN: *John Wesley and the Eighteenth Century*
ELSON, ARTHUR: *The Book of Musical Knowledge*
FRANCKE, KUNO: *History of German Literature*
GILSON, ETIENNE: *The Unity of Philosophical Experience*
GUIMPS, ROGER DE: *Pestalozzi: His Life and Work*
HECHT, HANS: *Robert Burns: The Man and His Work*
HOEBER, ARTHUR: *The Barbizon Painters*
MOWAT, R. B.: *The Romantic Age*
PIJOAN, JOSEPH: *History of Art*, Vol. III
RANDALL, J. H.: *Making of the Modern Mind*
READ, HERBERT: *Wordsworth*
THOMAS, CALVIN: *Goethe*
VULLIAMY, C. E.: *John Wesley*
WADE, J. D.: *John Wesley*

Chapter XLII

AGE OF SOCIAL AND POLITICAL REVOLUTION: 1775 TO 1832

Men of England, wherefore plough
For the lords who lay ye low?
Wherefore weave with toil and care
The rich robes your tyrants wear?
—Percy Bysshe Shelley, *Song to the Men of England*

After describing the momentous changes in thought during the Romantic Age, we turn our attention to the significant transformations in political life from 1775 to 1832. The new political conceptions, often inspired by the romantic sentiments that made their appearance during this period, came to be referred to as Liberalism. They comprise several basic ideas that grew out of the protest against the shortcomings of eighteenth-century thought, state, and society. (1) *Equality.* This meant abolition of political and class distinctions. There were to be no more serfs or nobles. (2) *Abolition of privileges.* No person or class was to enjoy special privileges such as exemption from taxation. (3) *Freedom from restraint in business.* Opposed to mercantilism in all its forms, liberals advocated laissez-faire conceptions. (4) *Democracy.* This signified that citizens were to have a voice in Parliament in respect to the policies of government. These points were not all realized at once. Though rarely completely victorious, Liberalism was a real and constant power in European history after 1789.

The American Revolution. First of the upheavals of this period was the American Revolution (1775–1783), which established the independence of the United States. It was very different from the French Revolution and others that followed, for in America there was no ancient society encumbered by class distinctions. The people who had settled along the Atlantic from Maine to Georgia were almost all English. Many had come to these wilds to find economic opportunity and freedom from social restrictions, others to enjoy religious liberty. After the settlement of Jamestown (1607) and Plymouth (1620) the Colonists occupied the region between the Atlantic coast and the Blue Ridge and Adirondack Mountains. They had cleared the woods, developed plantations, and created businesses. They enjoyed a great measure of local

MAP XXXI.—European colonies in North America in 1756.

freedom because the distance from England prevented the mother country from effectively regulating political life. A robust frontier life sprang into existence; the American settlers were characterized by independence and initiative.

Relations between Colonists and the mother country became less and less amicable. The chief cause of friction was the economic exploitation of the Colonies. Mercantilist conceptions had dominated relations with the mother country ever since the middle of the seventeenth century, when the navigation acts had been passed. Duties were levied on goods passing from one colony to another, and efforts were made to prevent Colonial merchants from trading with the West Indies. It proved impossible to enforce such drastic regulations. There were widespread evasion and much smuggling.

As a result of the Seven Years' War between England and France (1756–1763), the English national debt had risen greatly; and an effort was made to find revenue by tightening the measures regulating trade. Laws were passed to stop smuggling. Search warrants of the most comprehensive nature were issued. Such measures embittered the Colonists, and many began to resist. The "loyalists," who remained faithful to the mother country, failed to check the more extreme group.

Agitation for total independence increased, stimulated by the rationalist philosophy of the Age of Reason. Many Colonists read the works of John Locke. Thomas Paine (1737–1809), an American born in England who readily embraced the revolutionary philosophy, published *Common Sense*, a pamphlet that urged independence. He urged that Americans should avoid connections with Europe which "tend directly to involve this continent in European wars and quarrels and set us at variance with nations who would otherwise seek our friendship." Paine hated kings and their method of government. Referring to kings as "crowned ruffians," he argued that as the American Colonies had arrived at maturity they no longer needed the guidance of Great Britain. War for independence, according to Paine, was the only policy to be adopted.

Revolution was in the air, and theories justifying rebellion against established rulers were widely discussed. We have learned that scholastic philosophers like Thomas Aquinas held that a people possessed the right to rebel against princes who refused to rule in accordance with the laws of the country and persisted in acting contrary to the interests of their subjects. Later, during the Renaissance and Reformation, this reasoning became unpopular because princes asserted that they ruled by divine right. The principle of the right of rebellion, however, reappeared in the Netherlands in 1581, when the Dutch foreswore allegiance to their legitimate ruler, Philip II of Spain. The following expresses the theoretical basis of their action:

Inasmuch as all men know that princes are instituted of God to rule their subjects and protect them from tyranny and violence as a shepherd guides his sheep and as their subjects are not created by God to obey like slaves their every command in matters sacred or profane but as princes are instituted for the sake of their subjects, without which they cannot be princes, to rule them justly and with reason and protect and love them as a father loves his children and a shepherd his sheep, . . . be it known to all that, reduced to the greatest extremity, we by common deliberation have declared and declare that the king of Spain has forfeited *ipso jure* all hereditary title to sovereignty in these Low Countries.

A potent element in the theory of revolt was the doctrine of natural rights, a doctrine that had persisted from the Stoic philosophy in Greco-Roman days through Scholasticism in medieval times. Scholastic philosophers insisted that natural law, the basis of society, was derived from God's eternal law and instituted for the government of men, who possess certain "natural rights," derived from the ethical teachings of Christianity. During the Age of Reason, this Christian philosophical basis was undermined by the skepticism of thinkers like Voltaire and other deists. Consequently, the ancient teachings about natural rights, being robbed of its philosophical basis, lost some of its vital force. Thenceforth, the idea of natural rights became more vague, and was confused by a number of abstract principles such as those concerning man's original "state of nature," "life, liberty, and the pursuit of happiness," and "liberty, equality, fraternity." These principles were held to be inviolable; to defend them, men had the right to rebel against governments. The doctrine of natural rights was radically opposed to the teaching that princes held their position through divine right, but it still possessed explosive power, especially when coupled with the contract theory of government. What could princes do when subjects rose in rebellion, asserting that the contract originally made between princes and themselves had been broken and therefore was null and void?

The Declaration of Independence. The framers of the Declaration of Independence based their action upon the proposition that people might rebel when assailed in their natural rights. The second paragraph expressed this theory:

We hold these truths to be self-evident: That all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness; that, to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it and to institute new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. . . . But when a long train of abuses and usurpations, pursuing

invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government and to provide new guards for their future security.

The American Revolution ended victoriously for the Colonies in 1781. Two years later a treaty of peace was framed in which Great Britain recognized their independence and surrendered title to all land between the Atlantic Ocean and the Mississippi River from the St. Lawrence and St. Croix rivers on the north to Florida on the south. A new nation, founded on democratic principles and created by a successful rebellion, came into existence. Europeans living under autocratic rulers who based their rule upon divine right were inspired to follow the American example.

Articles of Confederation. During the Revolution and several years after, the Colonies formed a loose confederation. From Mar. 1, 1781, their affairs were regulated by the Articles of Confederation. The weakness of the articles lay in the wide liberties accorded to each state and in the slight power given to the central government to enforce its decrees. Realizing the inadequacy of the Articles of Confederation as an instrument of government, leading statesmen convoked the Constitutional Convention, which drew up one of the most remarkable documents in the history of political experiment. It was a written constitution, its provisions formulated in the light of the political experience of the Colonists and profoundly influenced by political philosophers like Locke, Rousseau, and De Montesquieu. The new constitution went into operation early in 1789.

The Constitution of the United States. The Constitution of the United States provided a general framework of government, a written constitution that, its authors believed, would provide a bulwark of liberty against the possible tyranny of a central government. It is interesting to consider the fact that the governments of Europe, with the exception of the Dutch Republic, had no such written constitutions. They regulated the affairs of their countries according to ancient custom or the will of an absolute ruler. In England, custom was modified by a series of statutes and by such measures as the Petition of Right (1628) and the Bill of Rights (1689). In the United States, however, the basic framework of government was specifically stated in the Constitution. There is no way of changing these fundamental provisions, aside from custom and judicial decision, except by amendment, which requires the approval of two-thirds of the Senate and House of Representatives and the ratification by legislatures of three-fourths of the states. As a political document the Constitution of the United States is of the greatest significance. Mexico and the states of Central and South America later drew up written constitutions. Certain countries of Europe,

notably France in 1791, adopted a written constitution following some of the principles of the Constitution of the United States. Thus the American Revolution proved that a democratic revolution could be accomplished successfully and furthermore that there were sufficient intelligence and knowledge among the middle and lower classes to produce a statesmanlike and constitutional government.

The American Constitution provided for an executive, a legislative, and a judicial branch. Its framers were convinced that the organization of the government should be divided into these three branches that they might check each other, thus preventing tyranny. This division of governmental powers into three branches had been championed by De Montesquieu, whose writings were widely read in America. The president was elected indirectly, that is, by electors chosen by vote of the people, for the framers hesitated to give the voters full powers in the choice of so important an officer. While they believed in the principle of the sovereignty of the people expressed through the ballot, they were determined that the president should always be a conservative person. Furthermore, the president's powers were limited in various ways: he was empowered to make treaties with foreign states, but such treaties had to be approved by the Senate; his administrative and judicial appointments were to be confirmed by the Senate; the president might be impeached for various reasons; and finally, being elected for 4 years, he was required to go before the country after a brief term of office, when the voters might approve or reject his policy.

Laws were to be made by Congress, which comprised two branches, the Senate and the House of Representatives. The former was composed of two senators from each state, elected by the state legislatures. The representatives were chosen directly by the people. Measures were to be proposed by either branch, but bills to produce revenue were to originate in the House of Representatives. If the president should veto a bill, Congress might pass it by a two-thirds vote. The judicial branch of the American government contained a series of federal courts. The Supreme Court of the United States was assumed to possess authority to pass on the constitutionality of laws passed by Congress and signed by the president. Federal judges, whether of the Supreme Court or of the lower courts, held office during good behavior and were appointed by the president, subject to confirmation by the Senate.

Produced in 1787, the American Constitution contained ideas characteristic of the eighteenth century. Its framers believed that men, on the basis of reason and common experience, could draft a framework of government that would serve the political needs of the people for an indefinite time. The Constitution, therefore, is partly a product of the Age of Reason. It admittedly is difficult for one generation to prescribe

methods of government that will prove satisfactory for its descendants. The remarkable feature of the American Constitution is that it has served well the political needs of the American people for a century and a half. Though written and therefore rigid, it has survived every economic and social change in American life. This is because it lays down only the fundamental forms of government. When necessary, the people may add amendments for which a fixed procedure is set forth in the Constitution. Ten such amendments were declared in force by the close of 1791. Since that time, eleven others have been passed. The Seventeenth and Nineteenth amendments provided for the popular election of United States senators and for woman suffrage.

The French Revolution. Important as was the American Revolution, the French Revolution was far more significant in the history of Western civilization, for it overturned time-honored institutions dating from the Middle Ages. Its causes were many and deep-seated. A small number of nobles who contributed little or nothing to the material welfare of the country appropriated a disproportionate part of the wealth produced by townsmen and peasantry. The *bourgeoisie* was excluded from affairs of state. The government was absolute and spendthrift, was rarely concerned about the opinion of the masses, and left the direction of affairs chiefly to the privileged nobility, who utterly lacked a sense of the value of money. By 1785, the national debt had grown so large that the government could no longer pay interest and meet ordinary expenses. As the people lost confidence in its ability to maintain a sound currency, a serious inflation set in and everybody suffered from the rapid rise of prices. The peasants, who had long labored under intolerable exactions and discriminations, grumbled audibly. The ever-critical *bourgeoisie* joined them in hoping for reform.

In 1787, King Louis XVI turned to the nobles for money to avoid financial disaster, but these privileged gentlemen, failing to recognize the dire necessity for reform, refused to make personal sacrifices. Financial difficulties increased; the temper of the crowds became more unfriendly. There was much agitation for a reconvening of the States-General, forgotten since 1614. As this ancient assembly included, besides nobility and clergy, representatives of the third estate, or the *bourgeoisie*, educated middle-class persons saw in it an opportunity to air their grievances in a legally constituted assembly.

The National Assembly. The estates that met at Versailles on May 5, 1789, represented, not the people of France, but rather the three classes into which they had been divided from time immemorial. The nobles spoke for themselves and theoretically also for the exploited peasantry, whose dire needs they could not comprehend. The bishops, abbots, and canons were mainly royal appointees; as a class, they did

not take statesmanlike views of the needs of the realm. The *bourgeoisie*, on the other hand, regarded the crisis far more seriously. Many of them had read Rousseau and De Montesquieu. Belonging to the Age of Reason, they viewed political institutions with critical eyes. They desired a more democratic assembly, one in which the members represented the people and not the privileged classes. Moreover, for the first time, they were in a powerful position; it was their class that had the ready cash which the state needed to function. Insisting upon their demands, they declared (June 16) that they constituted a National Assembly. The king gave way and on June 23 commanded the nobility and clergy to join the third estate. In this way the three estates became the National Assembly of France—a radical step, for it meant the destruction of an old idea, that a state is composed of three classes, the nobility, clergy, and *bourgeoisie*. The French people thenceforth were to be united into one large political family of Frenchmen.

We must pause at this point to discuss the rise of the sentiment of nationalism. A complex problem, it is a definite part of the cultural development of Western civilization. In Chap. I, we defined culture as a common way of living and thinking and intimated that in every age man naturally has had some affection for the society in which he lives, whether it be a tribal society, the Greco-Roman city-state, the medieval manor, or the modern state. Patriotism is a powerful sentiment, a devotion that people feel because of their membership in a group. The spirit of nationalism is much the same, except that we usually limit it to recent history and a prescribed cultural group. It appeared at various times as, for example, in England under Henry VIII and Queen Elizabeth and in Germany in the days of Martin Luther. It became especially powerful in France during the French Revolution and has been an increasingly significant force in the life of modern nations. That it should now make its appearance in France was quite natural. The French Revolution and the conditions producing it put an end to the idea that a state was an aggregation of classes, each possessing special privileges. In its place came the idea that the state was a political association of all men within its borders, irrespective of class, social or economic. Thus in France all citizens began to feel themselves as equal before the law. They believed that each member of the group should have a personal stake in maintaining the state. Nationalism therefore is one aspect of the political experience of the modern age, a cultural phenomenon of the first importance.

Declaration of the Rights of Man. As the old system was rapidly changing and a new one was bound to take its place, members of the National Assembly thought it well to draw up a list of the basic

rights of all men. It was reasoned that as the English had their Magna Charta and the Americans their Declaration of Independence, the French people should have a similar document. They therefore issued the Declaration of the Rights of Man and the Citizen, a document of incalculable importance throughout the next century. One of its more striking pronouncements is that "men are born and remain free and equal in rights." Its democratic sentiment is expressed thus: " . . . The source of all sovereignty is essentially in the nation; no body, no individual can exercise authority that does not proceed from it in plain terms." Reminiscent of Rousseau's *Social Contract* is the statement that "law is the expression of the general will. All citizens have the right to take part personally or by their representatives in its formation." The government's power to interfere with the liberty of the citizens was clearly limited, as follows: " . . . No man can be accused, arrested, or detained except in the cases determined by the law and according to the forms it has prescribed." Freedom of speech was guaranteed; no person might be disturbed because of his religious opinions. The Declaration of the Rights of Man and the Citizen appeared most radical at the time. It destroyed the theory on which the ancient class privileges of France rested. But its final clause definitely showed that the revolutionary movement, as long as it remained in the hands of the National Assembly, would be moderate. It stated that "property being a sacred and inviolable right, no one can be deprived of it unless a legally established public necessity evidently demands it, under the condition of a just and prior indemnity." "Liberty, Equality, Fraternity" became the slogan of the French Revolution.

THE CHURCH AND THE REVOLUTION. In its relations with the church, however, the National Assembly adopted a revolutionary attitude. The ancient church had served popular religious needs ever since the fourth century and had received so many gifts that it had become extremely wealthy, owning probably as much as one-fifth of the land of the realm. At the time of the French Revolution, there were perhaps 120,000 priests, monks, and nuns in France, and a large amount of money went into the coffers of the church. A goodly share was used in worship, almsgiving, and instruction, but far too great an amount went to the politically appointed bishops, archbishops, and abbots. This corruption was due to the fact that for centuries the king had nominated church candidates from among the nobility, who frequently had no moral or religious qualifications for such offices. Such appointees regarded such revenues as pensions, like those received direct from the royal treasury. Some paid little attention to their religious duties, leaving the serious work to substitutes and to the poor parish clergy, who sometimes lived on the

brink of starvation. When the French Revolution broke out in 1789 and the National Assembly proposed to seize the lands of the church, the higher clergy sympathized with the nobles.

The National Assembly took drastic steps in dealing with the church. Many of its members had read the innumerable criticisms of philosophers ever since Bayle and Voltaire about religion and the church. Irritated by the determined opposition of the prelates and influenced by the propaganda of the philosophers, the National Assembly was not lenient. There was a further consideration, a most potent argument—the state needed money, for the government was bankrupt. It was decided to seize the property of the church and use it to meet the obligations of the state. As early as November, 1789, the possessions of the church were seized, and in February of the following year monastic and other religious communities were suppressed. In July, 1790, a radical Civil Constitution of the Clergy was announced. This document regulated the status of the clergy, creating a civil, or political, body of religious officials, considerably reduced in numbers. They were to be elected by the people, paid by the state, and required to take a solemn oath of obedience to the Civil Constitution of the Clergy.

The drastic character of this measure is self-evident. For the state to seize the properties of an institution like the church, much older than itself, was a serious matter. But it was drastic in an even more important respect. Hitherto, the church had been an independent organism free from interference on the part of the state save in the appointment of its prelates. Now the state proposed to convert the clergy into a group of state officials, paid by the state, obsequiously serving the state. Hitherto, the prelates—archbishops, bishops, and abbots—had been political appointees, with the consequent possibility of corruption, but the corruption now threatened to engulf the lower clergy as well. Thus the evils that had done so much harm might become more widespread than ever before.

Reorganization of the Local Administration. The most permanent achievement of the National Assembly was the reorganization of the administration. Public authority vanished, and local government crumbled in the excitement of the events of 1789 and 1790. The confusing medley of local institutions by which France had been governed presented no consistent pattern such as we are accustomed to in modern states. Few opposed sweeping them away, and as early as the summer of 1789 France was divided into eighty-three departments. Each department was subdivided into *arrondissements*, or districts; each *arrondissement* into cantons; and each canton into communes. The department was a small unit; its inhabitants were able to visit the market of its chief town in a single day's journey. The reason for making the departments

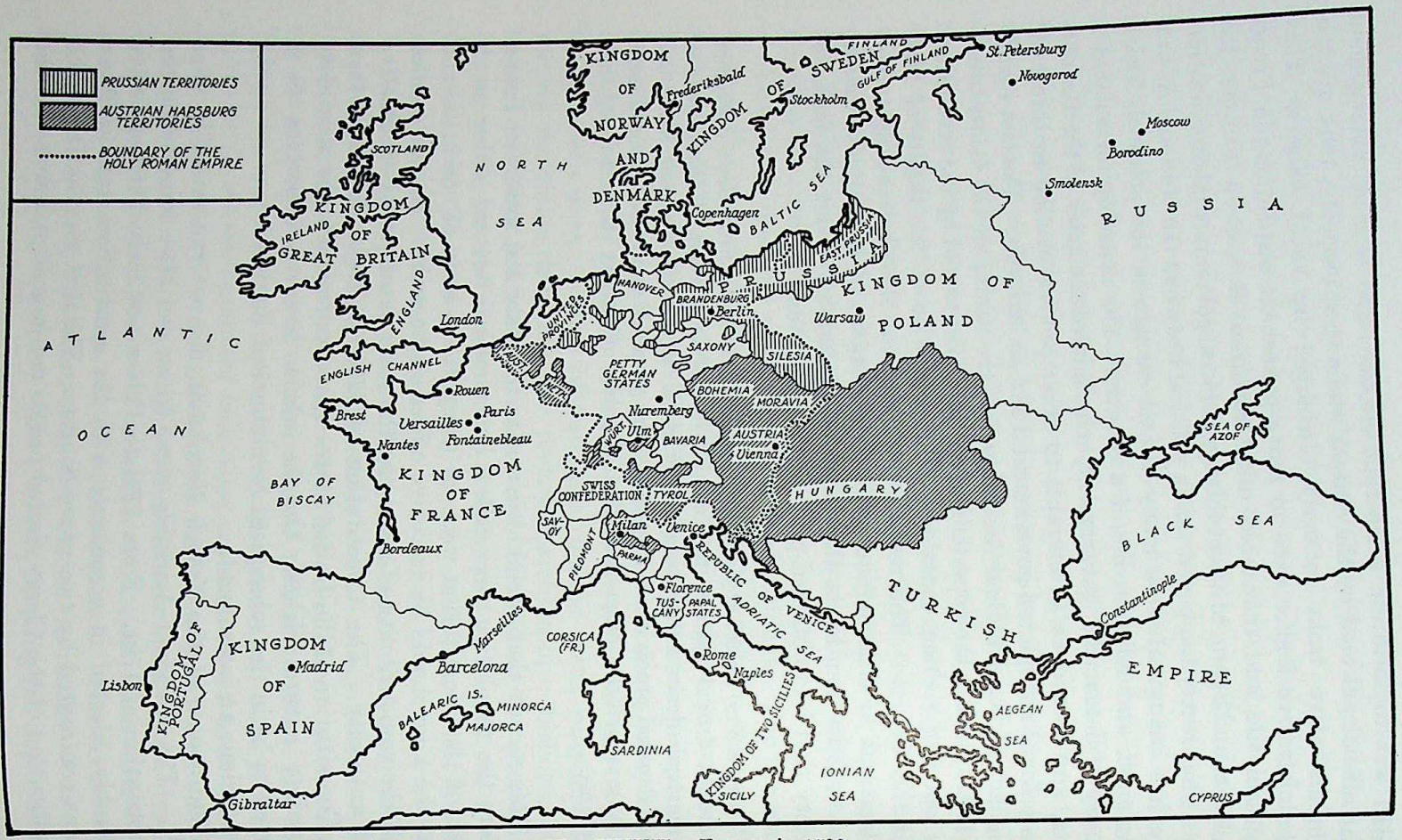
small was to facilitate democratic elections and efficient management. The officials, elected by the citizens who owned property, took over the administrative tasks formerly discharged by royal officers. These administrative bodies were to prove permanent institutions in French political life and influenced other countries of western Europe, like Belgium and Spain, to adopt this type of local governmental organization.

It has rarely happened that a political body like the National Assembly has inaugurated so many drastic changes in the political, social, economic, and religious life of a country. The assembly formulated a theory of democratic government, consolidated the gains of the Revolution, and served as an example to other peoples striving to throw off the yoke of antiquated governmental and social forms. The last significant act of the National Assembly was the issuing of the Constitution of 1791, putting the copestone upon the edifice reared by the revolution. Its opening section contained the Declaration of the Rights of Man and the Citizen. The rest of the document sketched the rights and obligations of citizens and outlined the organs of central government. The constitution made the following declaration about the forms of society that had obtained prior to the revolution:

> There are no longer any nobility, peerage, hereditary distinctions, distinction of orders, feudal regime, patrimonial jurisdiction, tithes, denominations or prerogatives derived therefrom, orders of chivalry, corporations or decorations which demand proofs of nobility or that are grounded upon distinctions of birth, nor any superiority other than that of public officials in the exercise of their functions.

This meant that the old regime, as the state and society of France before the revolution were called, had vanished forever. Other provisions of the constitution were for a legislative body of one house and that the king should be executive officer of the realm. He was saddled with the responsibility of managing the state but deprived of initiative and authority. The Constitution of 1791—a longer document than the Constitution of the United States—gave expression to the same ideas regarding natural rights. On the whole, however, important as it proved to be in the subsequent revolutions of Europe, it was not nearly so sagacious an instrument.

The course of the French Revolution did not run smoothly after 1791. The National Assembly came to an end after formulating the Constitution of 1791. From 1791 to 1792 a new body, the Legislative Assembly, elected in accordance with the constitution, met in Paris. It was confronted by two grave dangers. The first was that the Civil Constitution of the Clergy elected priests not in good standing with the



MAP XXXII.—Europe in 1789.

church. Peasants in many parts, especially in Brittany, were dissatisfied. They demanded priests against whom no charge of unorthodoxy could be made. They had other grounds for complaint, but the religious grievances brought them to a head, and a rebellious countryside threatened to ruin the government. The second danger came from abroad. Many noblemen had fled France and found refuge in Germany. There was much ill feeling in France toward Austria; for the "republican rabble" hated Marie Antoinette, who was correctly believed to be eager for Austrian intervention. The French foolishly declared war on Austria but found that that country had the support of other German states, particularly Prussia. French armies did not do well during 1792; and the excitable crowd, hating the very word king and detesting the queen, rose in insurrection on Aug. 10. The Legislative Assembly suspended the king, whereupon the Constitution of 1791 came to an end.

A new representative body, the Convention, was convoked and sat for 3 years, from 1792 to 1795. Its task was twofold, to draft a new constitution, and to govern France in the face of the many difficulties just sketched. The members busied themselves with futile discussions concerning the basis of a constitution. Much precious time was lost as the inexperienced members, chosen freely from the citizenry, were enthusiasts, incapable of constructive action. They drafted a republican constitution with liberal provisions that failed to give satisfaction. The peasants were hostile; and foreign powers either declared war or threatened to do so. Under these circumstances, the constitution formed by the Convention could never be put into operation.

The Convention was too large and unwieldy to govern France effectively. Hence, it entrusted this task to a small group of members, the Committee of Public Safety, that governed France from 1792 to July 10, 1793, when a new Committee of Public Safety was named. Upon its nine members, changed each month, devolved the executive business of the state. It promptly crushed every sign of rebellion. Unfortunately, its methods were violent; people were arrested on mere suspicion, and victims were sentenced without fair trial to be beheaded by the guillotine. At Nantes, a shocking number of prisoners were drowned without trial. The rule of the Committee of Public Safety has become famous as the "Reign of Terror." Although it violated the rights of man eloquently proclaimed by the Convention, the Reign of Terror did successfully establish order within the country (1794–1795).

The changes wrought by the revolution in France after 1789 produced a profound impression throughout Europe. The abolition of serfdom stirred the imagination of the common man in Germany, Italy, and other countries. He dreamed that the day of democratic government was at hand. Young people and idealists believed that a happy and perfect

era had suddenly dawned; poets like Wordsworth sang of the new day. At first, Englishmen believed that the French Revolution was like their Glorious Revolution of 1688 and expected the French people to create a constitutional monarchy. When the mobs of Paris seized (July 14, 1789) the fortress of the Bastille situated on the outskirts of the city, Charles James Fox, an English statesman declared, "How much the greatest event it is that has happened in the world, and how much the best!" Clubs watched the course of affairs in France and issued a steady stream of propaganda in favor of the revolution. A few extremists in England eagerly hoped for an overthrow of their own government. Soon, however, the excesses of French revolutionaries cooled their ardor.

Edmund Burke (*d.* 1797), a member of Parliament who had won fame for his defense of the American Colonists in their revolt against the mother country, became alarmed as early as 1790 and penned his *Reflections on the Revolution in France*, in which he deplored the fact that the French people were not merely content to correct old abuses but were determined to break with their past and set up a new government. "Standing on the firm ground of the British constitution, let us be satisfied to admire rather than attempt to follow in their desperate flights the aeronauts of France," he wrote. At first, Burke's conservative attitude was opposed by many. Thomas Paine replied with his *Rights of Man*, dedicated to George Washington. He had no misgivings and wrote as follows:

> Never did so great an opportunity offer itself to England and to all Europe as is produced by the two revolutions of America and France. By the former, freedom has a national champion in the western world; and by the latter, in Europe. When another nation shall join France, despotism and bad government will scarcely dare to appear. To use a trite expression, the iron is becoming hot all over Europe. The insulted German and the enslaved Spaniard, the Russ, and the Pole are beginning to think. The present age will hereafter merit to be called the Age of Reason, and the present generation will appear to the future as the Adam of a new world.

By 1793 the French were at war with many countries. They were eager in their new enthusiasm to stir up revolutions in other lands and also were under the threat of invasion. The Committee of Public Safety put forth almost superhuman efforts, rousing the people to a frenzy of patriotic enthusiasm well expressed in the classic hymn of nationalism, *The Marseillaise*, by Rouget de Lisle, so called because it was sung for the first time in Paris by a batallion sent from Marseille in the summer of 1792. The following translation of the first stanza gives a faint idea of its soul-stirring power:

Ye sons of France, awake to glory!
Hark, hark! what myriads bid you rise!
Your children, wives, and grandsires hoary:
Behold their tears and hear their cries,
Behold their tears and hear their cries!
Shall hateful tyrants mischief breeding,
With hireling hosts, a ruffian band,
Affright and desolate the land,
While peace and liberty lie bleeding!
To arms, to arms, ye brave!
Th' avenging sword unsheathe!
March on, March on, all hearts resolved
On victory or death!

A national army, the first of its kind in modern history, was created by the Committee of Public Safety. Formed by a democratic conscription, it constituted the fighting organ of the French nation. Henceforth, all Frenchmen were regarded as equal before the law. With the dissolution of social classes, Frenchmen shared equally in the advantages of French citizenship and the defense of their liberties. Unity and equality would be an empty expression if Frenchmen were unwilling to serve in mass in the army. The French army, constituted by the Committee of Public Safety, organized by the great general Lazare Carnot, and fired by fanatical enthusiasm, was phenomenally successful. It swept all before it during 1794 so that the Convention secured a brief peace through the Treaty of Basel (1795).

For the student of the psychology of revolutions, the French Revolution is a fascinating subject. He learns that it is difficult at any time, no matter how peaceful a state may be, to conduct political changes without trouble. The task is more complicated if a sudden and radical revolution has been initiated, overturning familiar institutions and putting new, untried ones in their place. The original French Revolution established a monarchy curbed by the provisions of the Constitution of 1791, but the excited crowds of Paris forced the government into ever more radical paths until internal anarchy and foreign invasion threatened to ruin the cause. The Convention then appointed the Committee of Public Safety, which inaugurated its drastic Reign of Terror in 1794. By the summer of 1795 the Convention and the Committee of Public Safety came to an end, and the tyrannical and violent Reign of Terror, no longer necessary, ceased.

The French people were now tired of excesses. There was acute distress caused in part by the utter depreciation of the paper money, called assignats, which had not been retired with the money received from the sale of confiscated church lands against which they had been originally issued.

THE DIRECTORY. A new government, known as the Directory (1795–1799), concentrated the executive power in five directors. Legislative authority was placed in two chambers, the Council of Five Hundred and the Council of Ancients. The former proposed and discussed bills, the latter adopted or rejected them. It was a government of checks and balances, one that tried to avoid the excesses of the Convention. Obviously the most violent phase of the revolution had passed; the conservative reaction, begun in 1795, was to be carried forward by a military adventurer, Napoleon Bonaparte.

NAPOLEON. The career of Napoleon is most interesting to the student of political psychology. Born in Corsica in 1769, he received a military education in France, became an officer, and in that capacity had some experience with the mobs of Paris as early as 1792. Opportunity to win a name for himself came in 1796, when he was given command of the French armies in Italy. The Italian campaign of 1796 and 1797 owed its success to the genius of Napoleon, whose fame soon eclipsed that of all other French generals. The directors, being no match for him, had good reason to fear him. He knew how to dramatize his successes. The Egyptian campaign of 1798 and 1799 brought him additional glory; and on his return to Paris he engineered a *coup d'état* in November, 1799. A new government, the Consulate, lasted until 1804. It was a veiled dictatorship, the state being managed by three consuls, of whom Napoleon was the chief. Popular elections were regulated, and elective legislative bodies were carefully controlled.

As dictator, Napoleon had almost complete control over the activities of the state. He knew how to court popular favor and conciliate the many elements antagonized by the governments of France since 1789. Large numbers of citizens were tired of violence, injustice, and continual change. Businessmen wanted stable conditions. Churchmen wished to revoke the hostile legislation against the church. All classes longed for peace and believed that Napoleon was able to provide it. He deserves to be remembered as a constructive despot like Frederick the Great of Prussia and Emperor Joseph II of Austria. In 1804 he was proclaimed emperor following a decree that the people, in a carefully controlled election, ratified unanimously. Thus came into existence the French Empire, which lasted until 1814.

But the empire did not bring peace to Europe. Napoleon was vainglorious, intoxicated with power. A military genius of the first order, he destroyed his enemies whenever they moved against him. Thus he conquered or reduced to the state of allies all of Europe west of the Carpathians, excluding the Balkans, England, Norway, and Sweden. He made and unmade princes, destroyed old states, and set up new ones. Nor did he scruple to overturn ancient institutions. He established

client states—states independent of France but more or less controlled by him. Among these were Spain, the Netherlands, and the Confederation of the Rhine, which Napoleon erected out of the territories of the defunct Holy Roman Empire. The only powerful states that refused to submit to him were England and Russia.

In an attempt to destroy England, Napoleon in 1806 evolved the continental system based upon a series of decrees whereby continental markets were closed to English manufactures. Napoleon believed that,

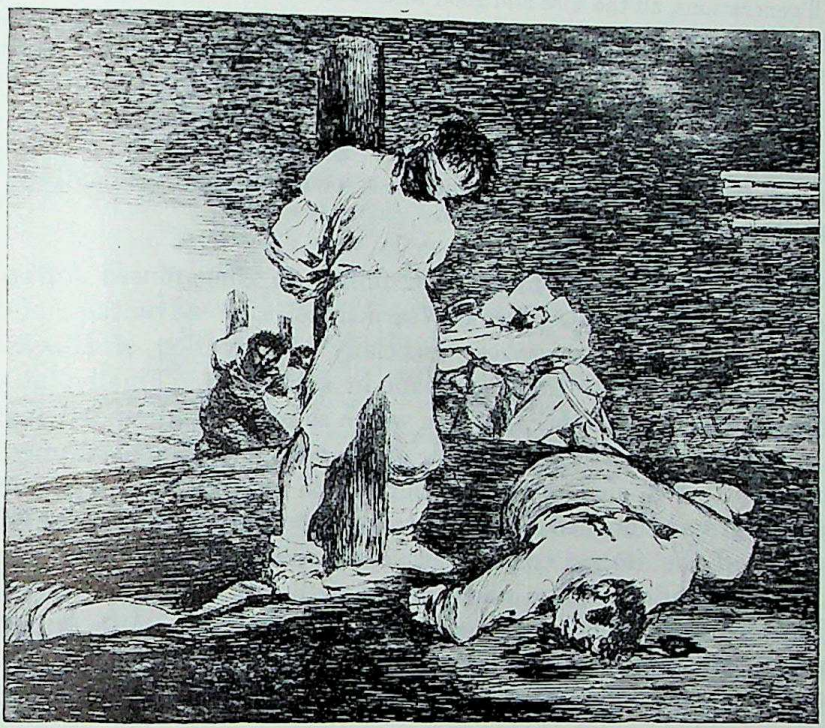


FIG. 119.—"There Is No Remedy," by Goya. (*Courtesy of the Metropolitan Museum of Art.*)

if her merchants were prevented from selling their products, England, dependent on the new industrial system, would speedily be ruined. All subjects and client states were compelled to cooperate even if it meant economic ruin for themselves. Great ports like Amsterdam lost their business, and people quite generally resorted to smuggling to make a living. Sacrificing prosperity in lands subject to Napoleon for a policy that benefited France only inevitably produced opposition. Furthermore, people disliked having their political interests subordinated to French whims and their lives dictated by French policies.

Small wonder that the spirit of nationalism, which appeared in France after 1789, arose now in most parts of Europe. The insurrections

in Spain that began in 1806 have been depicted by the realistic and satirical brush of Francisco Goya. Germany, too, felt deeply insulted by the Napoleonic bullying, and a sullen resentment developed, particularly in Prussia. In 1807 the philosopher Johann Fichte (1762–1814) penned his *Addresses to the German Nation* for the benefit of students at the newly founded University of Berlin. Addressed to the impressionable youths, his fiery words stirred up the flames of patriotism.

> All generations, all the wise and good who have ever breathed upon this earth, all their thoughts and aspirations for something higher mingle in these voices and surround you and lift to you imploring hands. Even Providence, if we may so say, and the divine plan of the universe in the creation of a human race—a plan which, indeed, exists only to be thought out by man and to be realized by man—adjures you to save its honor and its existence. . . . If you perish as a nation, all the hope of the entire human race for rescue from the depths of its woe perishes together with you.

Napoleonic despotism finally succumbed to the aroused forces of nationalism. Napoleon's enemies learned to take advantage of his political and military mistakes—especially his invasion of Russia in 1812 and costly efforts to keep Spain in subjection. Finally, at the Battle of Leipzig in October, 1813, in which so many armies participated that it became known as the "Battle of the Nations," Napoleon met his great defeat. National rebellions followed in central Europe; in 1814 the allied forces compelled Napoleon to abdicate and exiled him to Elba, an island off the Italian coast. His escape was followed by the brief rule of the Hundred Days, which ended with the Battle of Waterloo. Banished to St. Helena, an inaccessible island in the south Atlantic, Napoleon died there in 1821. His dazzling career, filled with the splendors of war, has long entranced students of history. A Napoleonic legend arose that credits the great hero with championing the principles of Liberalism in Europe. His dictatorial methods and militarism were conveniently forgotten by later generations—the lessons of history ignored.

Revolutionary Movements from 1815 to 1830. A strong reaction set in after Napoleon had been safely removed. The Congress of Vienna (1815) "restored" the political map of Europe so far as possible to what it had been in 1789, and a determined effort was made to uproot "liberal" ideas. This exasperated the middle classes, who could not forget principles of the French Revolution: Liberty, Equality, Fraternity. They continued to demand liberal political changes from 1815 to 1830. The spirit of Liberalism and nationalism gleamed brightly, especially in Spain, where revolutions were chronic during these years. Italy also was the scene of agitations. The Greek Revolution against Turkey, which lasted from 1821 to 1829, kindled the enthusiasm of all Europeans.

young and old, who had been educated in the Greek classics. They fancied that the ancient democracy of Greece was once more coming to life, shaking off the shackles of intolerable Turkish tyranny. Byron's participation in the Greek Revolution has already been referred to (see page 712). Even in the United States there was much zeal for the Greek cause, reflected in the fashions and the architecture of the time. Fitz-Greene Halleck (*d.* 1867) won fame from his poem addressed to Marco (Markos) Bozzaris, a Greek hero who surprised a Turkish camp in a night attack.

An hour passed on—the Turk awoke;
That bright dream was his last;
He woke—to hear his sentries shriek,
"To arms! they come! the Greek! the Greek!"
He woke—to die midst flame, and smoke,
And shout, and groan, and saber stroke,
And death shots falling thick and fast
As lightnings from the mountain cloud;
And heard, with voice as trumpet loud,
Bozzaris cheer his band:
"Strike—till the last armed foe expires;
Strike—for your altars and your fires;
Strike—for the green graves of your sires;
God—and your native land!"

The middle classes of Europe had become more prosperous and confident during these decades. As Liberals, they believed in the principles of the French Revolution and insisted upon a voice in the government. As they were wealthy, they were in a position to make themselves heard. But there was much opposition to their desires, for the governments established in 1815 after the downfall of Napoleon were determined to prevent revolutions. They would make no concession to liberal demands such as extending the suffrage to the propertied middle classes, permitting representation in parliaments, and making ministers responsible to Parliament and not to the king. Opposition in France to the restored king of the Bourbon house and to absolute monarchy led to a revolt in July, 1830. Rebellion flared up in many other countries, in some cases owing to strong nationalist hatred of foreign rule as in Poland, where there was bitter feeling against the Russian government. These uprisings are generally referred to as the "July revolutions." They were bourgeois in character and only slightly, if at all, proletarian.

Reform Movements in England. While the countries on the continent of Europe witnessed many revolutions in 1830 and the years following, England passed through a period of relatively quiet reform. Violent changes were not necessary because the English government possessed considerable elasticity and Parliament, the governing body

of the country, was a representative institution. However, since the Glorious Revolution of 1688, it had been controlled by wealthy landlords who were unsympathetic to ideas of social legislation, which became more and more urgent as industrialization proceeded. But in 1832, amid scenes of great excitement, the Reform Act was forced through Parliament by urban interests, particularly the powerful industrialists. The political party of the industrialists was called the Whig party, that of their opponents the Tory. The Reform Act converted Parliament into a more truly representative organ as it extended the suffrage among the upper classes in the towns. It stopped short, however, of giving the vote to working-men and renters of cheap houses.

The year 1832 marks a term in the struggle for political liberty that opened with the revolt of the American Colonies. Liberty, expressed in the demand for parliamentary government, was sought everywhere. Closely related to this, as in Greece, Italy, and Poland, was the sentiment of nationality—love of country and native language, literature, and custom—which kindled the passion for liberty to a white heat. Revolutionary movements until 1832 had been inspired largely by the powerful and articulate upper class townsmen, bankers, owners and managers of factories, and directors of commercial undertakings. But the neglected interests of the workers in the developing industrial centers now became vocal; demands were made for better conditions. For some time, workers tried to gain their ends by political means, not violence. Liberalism remained a dominant factor in politics; henceforth, it was more and more concerned with the interests of the working classes.

FOR FURTHER READING

ARTZ, F. B.: *France under the Bourbon Restoration*, 1814–1830
———: *Reaction and Revolution*, 1814–1832
BECKER, C. L.: *Beginnings of the American People*
———: *The Eve of the Revolution*
———: *The Heavenly City of the Eighteenth Century Philosophers*
BRINTON, CRANE: *A Decade of Revolution*, 1789–1799
BRUUN, GEOFFREY: *Europe and the French Imperium*, 1799–1814
EGERTON, H. E.: *The Causes and Character of the American Revolution*
FUETER, EDUARD: *World History*, 1815–1920
GERSHOY, LEO: *The French Revolution*, 1789–1799
———: *The French Revolution and Napoleon*
HAYES, C. J. H.: *Essays on Nationalism*
HAZEN, C. D.: *Europe since* 1815
MADELIN, LOUIS: *The French Revolution*
MATHIEZ, ALBERT: *After Robespierre, the Thermidorian Reaction*
———: *The Fall of Robespierre*
POSTGATE, R. W.: *Revolution from* 1789 *to* 1906
VAN TYNE, C. H.: *The American Revolution*, 1776–1783
WEST, W. M.: *A History of the American Nation*

Chapter XLIII

AGE OF ROMANTIC IDEALISM

We are today, one and all, too apt to forget the fact that history, in its deepest sense, does not consist merely in secular happenings, but that it is always at the same time a sacred process, a spiritual happening.—Peter Wust

FOLLOWING the wars of Napoleon, Romantic idealism, which had begun with Rousseau, triumphantly spread over all parts of Europe. The world appeared to be expanding economically and politically. Opportunity beckoned on every side; wealth increased at a fantastic rate. The middle classes demanded a share in education and higher culture. Liberty was the watchword of the new order, freedom its dominant passion, and formal restraints were disparaged. These forces produced new ideas in religion, literature, art, morality, science, and learning. Broadly speaking, these were romantically idealistic or scientific and naturalistic. In this chapter, we shall consider the more important aspects of romantic idealism, which prevailed between 1830 and 1875.

The Novel. One would naturally expect in the Romantic Age that poetry would flourish and poets be widely read, but it was the novel that possessed the greatest appeal. A novel is a fictitious account in which characters and actions are more or less typical of actual life and the narrative is carefully developed by means of a plot. The novel is a particularly effective means of presenting all manner of problems—social, economic, political, scientific, religious, and moral. This made it an instrument of special appeal to the middle classes, who, formerly as untutored as the peasantry, cared little for the doings of kings and nobles. Now that they were rising intellectually and financially, they required literature they could enjoy and understand.

English Novelists. At the opening of the nineteenth century appeared the novels of Jane Austen (1775–1817). She was especially interested in character and the everyday life and manners of the country society of southern England. Her novels also had a moral tendency popular in her time. *Pride and Prejudice* is the story of the Bennet family. Elizabeth, one of the daughters, entertains a strong prejudice against a well-to-do suitor, whose pride antagonizes her. The characters are clearly drawn and present a vivid picture of middle-class society. Sir Walter Scott (1771–1832) has already been noted (see Chap. XLI) in

connection with the romantic revolt. He was the first novelist whose works were read by thousands. The plots are clearly drawn, the characters concrete personalities, and the incidents vividly presented. Scott was a patriot who loved the past, and the historical novel was his great creation. So popular was Scott and such was the appeal of his romances that it is no exaggeration to say that a multitude of readers gained their first love for medieval history from *Ivanhoe*, *The Abbot*, *Kenilworth*, *Quentin Durward*, and *The Talisman*.

Owing to the success of such writers, the novel by the middle of the nineteenth century had become the most universally appreciated form of literature, surpassing even the essay. The constantly growing reading public preferred it to the drama, for it could be read at odd moments and provided a kind of entertainment that the lower classes could really afford. The novel supplanted poetry in the affection of the masses; the future belonged to the novelist.

Charles Dickens (1812–1870), the most remarkable English novelist of his day, was born in London and brought up amid hardships. As a reporter he formed a wide acquaintance with men and women. Later he wrote masterly novels peopled with a gallery of vivid characters drawn from the lower classes. Many of them are eccentric and exaggerated; yet Fagin the Jew, Oliver Twist, Pecksniff, Micawber, Scrooge, Mr. Pickwick, Dick Swiveller—to mention but a few—are unforgettable. Dickens hated wrong; his novels are concerned with the social and economic abuses that humanitarian men and women wanted to see rectified in accordance with ordinary conceptions of justice.

Dickens's first great work is the *Pickwick Papers*, a story filled with keen observation mingled with an inimitable humor. *Oliver Twist*, a tale of the London underworld, reveals the unfortunate conditions under which defenseless waifs were forced to live. *Nicholas Nickleby* portrays the scandalous conditions in some boarding schools. *Bleak House* is an attack upon the tedious delays in law courts, which caused great injustice. *Little Dorrit* centers in the evils of the debtor's prison, an institution that cried for remedy. *David Copperfield*, the story of an orphan boy, abounds in observations on social conditions. *Dombey and Son* is an attack upon banks and bankers. *Martin Chuzzlewit* is interesting to Americans because it records impressions gathered on a trip to the United States. *A Tale of Two Cities*, a historical novel dealing with the French Revolution, is in a class by itself. One may question its excellence as compared with the historical novels of Sir Walter Scott, but as a tale of human sacrifice it is most effective. Other enduringly popular tales by Dickens are *The Cricket on the Hearth*, *A Christmas Carol*, and *The Old Curiosity Shop*. The *Child's History of England* reveals Dickens as a patriot. Taken together, these books

present an accurate picture of the thought, life, and problems of a century ago.

Another English novelist who became almost as popular as Dickens was William Makepeace Thackeray (1811–1863). The son of well-to-do parents, Thackeray moved among the upper classes, and his novels concern ladies and gentlemen of social standing and good breeding. Unlike Dickens, Thackeray's style is polished and his books contain no farce, melodrama, or caricature. They deal with the life, character, and foibles of the upper classes. *Vanity Fair*, his masterpiece, is the story of Becky Sharp, a female rogue without scruples. The characters are sharply delineated, and a moral warning is clearly intended. The setting, which includes the social activities in Brussels just before the Battle of Waterloo in 1815, is to a certain extent historical. *Pendennis* is the tale of a youth of good family who becomes involved in foolish escapades but finally comes to his senses and settles down to a sober life. *Henry Esmond* is a historical novel the scenes of which are laid in the days of Queen Anne. *The Newcomes* deals with the unhappy love affairs of Clive Newcome and his cousin Ethel and their final union. Colonel Newcome, Clive's father, is a typical English gentleman of seventy-five years ago. As a portrayer of human frailties, Thackeray has had few equals.

The chief woman novelist of Queen Victoria's reign was Mary Ann Evans who adopted the pen name of George Eliot (1819–1880). She was reared in Warwickshire and belonged to a substantial family of land-owners. Brought up in great strictness, she showed an inclination to rebel, a characteristic among the Liberals of the day. She believed that morality was essential and even inescapable, but as Adam Bede, a character in the novel of that name, declares, "It isn't notions sets people doing the right thing—it's feeling." Each man must fashion his life morally and spiritually through his own struggles. *Adam Bede* is a great psychological novel, speaking eloquently of the English countryside. It also portrays the impression that the Wesleyan religious revival exerted upon the country folk. *The Mill on the Floss* tells of the difficulties of an imaginative girl who struggled tragically against unjust social conventions. *Silas Marner* has ever been a favorite. It is the story of a weaver who, innocently accused of a crime, becomes a recluse but eventually regains his interest in life when he adopts a foundling girl. These novels show a deep understanding of human motives and are dominated by a burning desire to put an end to injustices that cramp lives and cause tragedy.

Space precludes more than a mention of other eminent novelists of Queen Victoria's reign. Edward Bulwer-Lytton (1803–1873) wrote some remarkable historical novels, including *The Last Days of Pompeii*, *Rienzi*,

The Last of the Barons, and *Harold*, the last a story of the Norman Conquest based upon the embroidered scenes of the Bayeux tapestry. Charles Reade (1814–1884) is noted for *The Cloister and the Hearth*, which serves as an excellent introduction to Renaissance life in northern Europe. Charlotte Brontë (1816–1855), who wrote *Jane Eyre* and *Shirley*, showed mastery in depicting emotion, especially that of thwarted love in women. We must close this list by referring to Charles Kingsley (1819–1875), a minister in the Anglican church and an advocate of Christian Socialism. His novels show the spirit of the reformer; his soul revolted against filth, disease, sweatshop conditions, and the injustice inflicted upon working people by the economic exploitation of the industrial age. According to Kingsley the justice that lies at the basis of the Christian religion should be carried out in industrial practice. His reforming novels *Yeast* and *Alton Locke* portray the economic abuses of the day. His *Water Babies*, a child's book, reveals the keen interest in nature current during the nineteenth century. Further, in the vogue of the times, he wrote a great historical novel *Westward Ho!*, which glorified the England of Queen Elizabeth's reign.

Early American Literature. Literature in America came to maturity under the trying conditions of the frontier. At first, Americans were too busy clearing the forests, preparing the soil for cultivation, and building homes, to read books. Such literature as appeared before the middle of the nineteenth century, however, well expressed American life and thought. Naturally it also reflected the life and ideas of England and shared in such currents of European thought as Romanticism, Americans being particularly responsive to the idea of freedom and the influences of nature. William Cullen Bryant (1794–1878) was America's first well-known poet. Born in Massachusetts of Puritan stock, he was brought up amid the intellectual activities that animated New England life after 1800. He was the first American to make effective use of blank verse. The following lines from his *Forest Hymn* betray romantic influences, especially in the treatment of nature. Further, the poem states a theory of the origin of religion as held at that time by eighteenth-century rationalists and often propounded by followers of the Romantic movement.

> The groves were God's first temples. Ere man learned
> To hew the shaft, and lay the architrave,
> And spread the roof above them—ere he framed
> The lofty vault, to gather and roll back
> The sound of anthems; in the darkling wood,
> Amid the cool and silence, he knelt down,
> And offered to the Mightiest solemn thanks
> And supplication. For his simple heart

Might not resist the sacred influence
Which, from the stilly twilight of the place,
And from the gray old trunks that high in heaven
Mingled their mossy boughs, and from the sound
Of the invisible breath that swayed at once
All their green tops, stole over him, and bowed
His spirit with the thought of boundless power
And inaccessible majesty. Ah, why
Should we, in the world's riper years, neglect
God's ancient sanctuaries, and adore
Only among the crowd, and under roofs
That our frail hands have raised? . . .

Bryant's *Yellow Violet* has been a prime favorite.

When beechen buds begin to swell,
And woods the bluebird's warble know,
The yellow violet's modest bell
Peeps from the last year's leaves below.

Ere russet fields their green resume,
Sweet flower, I love, in forest bare,
To meet thee, when thy faint perfume
Alone is in the virgin air. . . .

The most influential of early American novelists was James Fenimore Cooper (1789–1851). Brought up in western New York, then part of the frontier, he understood frontier conditions and formed some acquaintance with Indian life and lore. A master of narrative and one of the world's greatest romancers, his tales presented refreshing scenes to Europeans, who regarded the New World through the idealizing eyes of Rousseau. Cooper opened several new fields for the novel. *The Leatherstocking Tales* represents the forest and the prairie and comprises *The Deerslayer*, *The Last of the Mohicans*, *The Pathfinder*, *The Pioneers*, and *The Prairie*. Cooper also created the novel of the sea when he wrote *The Red Rover*. His novels were read everywhere and had many imitators. To Americans these stories appeared particularly interesting because they described American life at the opening of the nineteenth century.

More scholarly and more definitely a man of the world than Cooper, Washington Irving (1783–1859) was the first American writer to win a wide reputation in Europe. His *Sketch Book*, kindly, humorous, and gentle, was at once hailed as a notable volume and has since been accepted as a classic. It is a collection of short tales, among which appear the immortal *Rip van Winkle* and *The Legend of Sleepy Hollow*. His *Knickerbocker History of New York* is a romantic and humorous account of the early days of that city. He also wrote the more serious and much read

Life and Voyages of Christopher Columbus and an equally popular *Life of George Washington*. Nathaniel Hawthorne (1804–1864) is one of the most distinguished of American writers. His *Scarlet Letter* is a tale of early New England life in which the Puritan environment is portrayed fairly accurately. With Cooper, Irving, and Hawthorne, America made its debut in the world of letters.

Of the other American prose writers of the period, we can consider only one—Harriet Beecher Stowe (1811–1896). Though by no means of the highest rank, she has become famous because of her *Uncle Tom's Cabin, or Life among the Lowly*. Born in New England, she shared in the intellectual activity characteristic of its society but lived much of her life in Cincinnati. Situated on the Ohio River, which formed the boundary between the slave and the free states, this city became the center for the underground railway, as the secret organization to aid fugitive slaves was called. There Mrs. Stowe had abundant opportunity to hear about the horrors of slave hunting, which outraged her humanitarian sentiments. She contributed to an antislavery magazine and in 1852 wrote her novel, which won unexampled popularity. *Uncle Tom's Cabin*, translated into many languages, is an excellent example of the novel of purpose. Such was its influence in stimulating antislavery sentiment that its publication constitutes a significant event in the history of America.

The French Novel. On the continent of Europe, especially in France, there were a number of great novelists. Victor Hugo (1802–1885) imbibed the romantic ideas current in his youth and during his early years wrote poems dealing with nature and her myriad colors and forms. His greatest fame came from *The Hunchback of Notre Dame*, a tale with a medieval setting presenting a romantic picture of the cathedral of Paris, Notre Dame. This novel is one of the best examples of the growing interest in the Middle Ages. Victor Hugo also wrote historical novels such as *Ninety-three*, a tale of the French Revolution giving a stirring picture of the rebellions among the peasantry at that time. *Les Misérables* reflects another tendency of the Romantic movement—intense interest in the life and activity of the common people.

Alexandre Dumas (1802–1870), the son of an adventurer of the French Revolution and grandson of a negress from the West Indies, produced a series of highly distinctive historical romances. They abound in vivid scenes and exciting action. The historical element is slight, but the spirit of the age with which each story deals is reproduced with fidelity. *The Three Musketeers*, published in 1844, is his most famous work. Other writers who must also be mentioned are Honoré de Balzac and George Sand. Balzac (1799–1850) rose from the lower middle classes, showed keen understanding of their problems and point

of view, and became the best delineator of the follies, vices, stupidities, and petty thoughts of the common people. His *Human Comedy* is an admirable picture gallery of middle-class characters of the France of about 1840. George Sand (1804–1876) poured forth an unending stream of romances characterized by a spirit of revolt against the moral and social flaws that exist in every society. She illustrates the melodramatic, morbid tendencies of the romantic rebels of the time. This same morbidity we have already noted in describing the poetry of Byron.

The Russian Novel. Russia, the literature of which was to exert an immense influence during the nineteenth century, produced several novelists of importance who at once reflected the major European interests of the day and were ever preoccupied with the problems of life peculiar to the Russian environment. Thus Ivan Turgenev (1818–1883) in *Fathers and Sons* portrayed with melancholy pessimism the revolutionary tendencies seeping into Russia from western Europe. Gogol (1809–1852) depicted the provincial society of Russia in his *Dead Souls*—humorous sketches showing men and women in an uncomplimentary light.

The greatest of Russian novelists is Feodor Dostoevski (1821–1881), who, like Dickens, understood the common people and wrote voluminously about them. He described the harshness of the Russian environment but was optimistic regarding the qualities of the peasants, holding that they possessed virtues which "better" classes would do well to imitate. This interest in the common people is best illustrated in his *Poor People*. Dostoevski's belief that there is much good in even the worst men and women brought up in poverty and among bad influences is presented in masterly fashion in his *Crime and Punishment*.

English Poetry. Although the poets did not have the following among the middle classes that the novelists did, their writings, like the novels of the period, deal with the life, thought, problems, and aspirations of the people of the time. The English poet who illustrates this more than any other is Alfred Tennyson (1809–1892). He was a master of style yet spoke to middle-class men and women who lived conventional lives and believed in truth, religion, morality, domesticity, friendship, sobriety, patriotism, and the cultivation of the mind by studying the great monuments of cultural tradition. Thus, Tennyson was the ideal poet of the man of average culture—and such men appeared in vast numbers during the industrial age.

Tennyson's *In Memoriam* is a poem dedicated to the memory of his friend Arthur Henry Hallam, who died in 1833. One of the noblest elegies ever written, it should be read to grasp the point of view of our forefathers of about 1850. The poet's religious convictions are presented in the opening verses.

Strong Son of God, immortal Love,
Whom we, that have not seen thy face,
By faith, and faith alone, embrace,
Believing where we cannot prove;
. . . . . .
Our little systems have their day;
They have their day and cease to be;
They are but broken lights of thee,
And thou, O Lord, art more than they.

The following stanzas illustrate the poet's beautiful descriptive style:

Calm is the morn without a sound,
Calm as to suit a calmer grief,
And only thro' the faded leaf
The chestnut pattering to the ground;

Calm and deep peace on this high wold,
And on these dews that drench the furze,
And all the silvery gossamers
That twinkle into green and gold; . . .

Calm on the seas, and silver sleep,
And waves that sway themselves in rest,
And dead calm in that noble breast
Which heaves but with the heaving deep.

That Tennyson comprehended the nature of the scientific revolution in process may be shown by selecting random stanzas. He understood geological changes, for example.

The moanings of the homeless sea,
The sound of streams that swift or slow
Draw down Aeonian hills, and sow
The dust of continents to be; . . .

Nine years before Darwin published his *Origin of Species*, Tennyson expressed something of the great naturalist's philosophy.

The wish, that of the living whole
No life may fail beyond the grave,
Derives it not from what we have
The likest God within the soul?

Are God and Nature then at strife,
That Nature lends such evil dreams?
So careful of the type she seems,
So careless of the single life,

That I, considering everywhere
Her secret meaning in her deeds,
And finding that of fifty seeds
She often brings but one to bear, . . .

The Princess, dealing with the question of the advanced education of women—one of the altruistic themes of the time—approaches the satirical. In it appear a number of lyrics of unforgettable beauty, among them the following: *As thro' the Land at Eve We Went; Sweet and Low; Tears, Idle Tears, I Know not What They Mean; O Swallow, Swallow, Flying, Flying South; The Bugle Song.* The following is the opening stanza of *The Bugle Song:*

The splendor falls on castle walls
And snowy summits old in story;
The long light shakes across the lakes,
And the wild cataract leaps in glory.
Blow, bugle, blow, set the wild echoes flying,
Blow, bugle; answer, echoes, dying, dying, dying.

Tennyson's great love for medieval tales is shown in *Harold* and *Idylls of the King*, and his patriotism is expressed in *Ode on the Death of the Duke of Wellington.*

Another notable poet was Robert Browning (1812–1889). Although never lacking enthusiastic admirers, he was less popular than Tennyson because he strove to depict feelings of more than ordinary intensity. Yet he expressed the deeply ingrained optimism of the age, believing that if a man keeps his ideals untarnished he will rise to higher things. Browning, interested most of all in the exuberance of life and especially in the theme of passionate love, was a profound psychologist whose characters are effectively presented at the moment of moving crises. His wife, Elizabeth Barrett Browning (1806–1861), wrote poems that were far more popular in their own day than those of her husband. Among her best are the *Sonnets from the Portuguese*, a series of excellent sonnets inspired by affection for her husband, and *The Cry of the Children*, an attack upon the practice of child labor in mines and factories. In spite of remedial legislation at various times, this evil had continued until a report in 1844 once more called attention to it. Mrs. Browning's verses were intended to secure action.

Do ye hear the children weeping, O my brothers,
Ere the sorrow comes with years?
They are leaning their young heads against their mothers,—
And *that* cannot stop their tears.
The young lambs are bleating in the meadows;
The young birds are chirping in the nest;

The young fawns are playing in the shadows;
The young flowers are blowing toward the west—
But the young, young children, O my brothers,
They are weeping bitterly!—
They are weeping in the playtime of the others,
In the country of the free.

The Brownings spent their married life in Italy. Robert Browning chose many of his characters from the Italian Renaissance but endowed them with a morality that belonged to his own age. His *Pippa Passes* is the story of a little Italian factory girl singing as she goes forth on her annual holiday; her merry notes and simple innocence bring new light into wretched lives. One of its lyrics is the following:

The year's at the spring,
And day's at the morn;
Morning's at seven;
The hill-side's dew-pearl'd;
The lark's on the wing;
The snail's on the thorn;
God's in His heaven—
All's right with the world!

Browning expressed his convictions in dramatic monologues in which the characters tell their experiences or explain their views on life. *Saul*, *Andrea del Sarto*, *The Bishop Orders His Tomb at St. Praxed's Church* and *Fra Lippo Lippi* are typical. *The Ring and the Book* is a poem made up of twelve monologues, each telling the story from a different point of view.

American Poetry. Although less significant as masters of literary expression than Tennyson and Browning, American poets deserve mention. The New England group faithfully translated the views of life and moral sentiments cherished in that day. Most popular was Henry Wadsworth Longfellow (1807–1882), whose treatment of everyday themes in such poems as *The Village Blacksmith* endeared him to all. His moral and religious views are best shown in *A Psalm of Life* and *Excelsior*. *Hiawatha*, *The Belfry of Bruges*, the romantic tale of *Evangeline*, and his translation of Dante's *Divine Comedy* reveal a liberal taste. James Russell Lowell (1819–1891), who also belonged to the New England group of writers and early won great fame, was a staunch defender of democracy, a foe to political corruption and slavery. His wit and satire are well revealed in *The Biglow Papers*. John Greenleaf Whittier (1807–1892), a Quaker brought up in straitened circumstances, possessed a limited education but had a wholesome attitude toward life and was pious, natural, and humane. A determined opponent of slavery, he wrote many poems that stimulated the abolition movement. His

other verse dealt with religious experiences and with rural life. His best known poems are *Voices of Freedom*, *Songs of Labor*, and *The Barefoot Boy*. Although born in Boston, Edgar Allan Poe (1809–1849) was never associated with the New England group. His poetry is most musical; few writers have been able to produce such haunting rhymes. His themes seem morbid, in many cases being associated with the thought of death as in *The Raven*. He also wrote tales replete with gloom and mystery and several stories that are the forerunners of the detective story. Whereas Longfellow and Lowell acquired only a slight reputation in Europe, Poe's verse inspired symbolists like Mallarmé and Swinburne.

Walt Whitman (1819–1892) is in a class by himself. Born on Long Island, he belonged to the throbbing democratic life of New York and the Middle West, to which he later journeyed. He cared nothing for traditional verse forms and as little for any other of the conventions. Although many object to his formless and sometimes repetitive verse, others see in it the robust freedom of American life. His belief that there is much good in all things, material or spiritual, and his exultation in the boundless vistas of the American continent and the beauties of nature link him with the Romanticism of Rousseau and Wordsworth. This note of liberty, sounded in his *Leaves of Grass*, was keenly appreciated in Europe, where he was regarded as a preacher of the new freedom springing up on the western continents. In some respects, Whitman is the most truly American of all the poets of the past century.

Moralists and Critics. A society that changed as rapidly as did that of Europe and America in the industrial age and brought forth such a wealth of literature naturally produced moralists and critics. We have noted the contributions of Thomas Carlyle (1795–1881) to the art of historical writing. Born in Scotland of humble but upright peasant folk, Carlyle possessed their seriousness and forthright candor and adopted a stern, moral view of life reinforced by a study of German philosophers like Kant and Hegel. In *Sartor Resartus* he attacked the shams and the easy faith in material things so characteristic of democracy. His *Past and Present* contrasts medieval serfdom with the conditions of workers in the industrial age, to the disadvantage of the latter. In it he denounced the current materialistic laissez-faire theories of economics and advocated as a substitute just dealing and the development of a sense of duty and religion. Carlyle's style is rugged but honest; to many his thought appears reactionary, but it is that of an honest man who saw through the superficialities of nineteenth-century culture.

Matthew Arnold (1822–1888) was more refined and polished than Carlyle but also less profound. He possessed the advantages of the best education of the day and became a professor at Oxford. He was truthful and upright but in religion a skeptic; like George Eliot, he divorced

religion from morality. This absence of faith is shown in his poem *Dover Beach*. But excellent as Arnold's gifts were as a poet, his reputation rests mainly upon his work as a literary critic. The age in which he lived produced innumerable literary works, which needed sifting. In *Culture and Anarchy*, Arnold argued that this could be accomplished by judging them in the light of the thought of the great masters, ancient as well as modern. He had an exalted conception of the function of poetry, which he believed was the best vehicle of ideas. "More and more mankind will discover that we have to turn to poetry to interpret life for us, to console us, to sustain us. Without poetry, our science will appear incomplete, and most of what passes with us for religion and philosophy will be replaced by poetry," he declared optimistically. Finally, he believed that "culture" could regenerate society. His use of this word is different from ours, which is based on anthropology. According to Matthew Arnold, culture consisted in "knowing ourselves and the world." The only way to attain culture was "to know the best which has been thought and said in the world." Culture, he thought, would take the place occupied by religion and art during the Middle Ages.

Ralph Waldo Emerson (1803–1882), the greatest American commentator on moral and intellectual questions, was a profound idealist but withal a shrewd and practical man. Like Carlyle, he studied Hegel and other German philosophers and believed in the basic divinity of all things. This belief seemed to give firmer foundation to individual worth and dignity and made him the prophet of transcendentalism, a movement that became popular in America. Emerson also won a following in Europe, as his *Essays* and *Representative Men* had a point of view much like that of Carlyle's *Heroes and Hero-worship*.

Art in the Period of Romantic Idealism. During these years the romantic tendencies in art reached their fullest fruition, passed into decay, and were subjected to much criticism. We have already noted the Barbizon school of painters in France who idealized nature and common life and have also considered the remarkable English painters of poetic landscapes, particularly Joseph Turner (see Chap. XLI). The patriotic note in painting and sculpture continued in popularity after it had been successfully initiated by Eugène Delacroix (1798–1863). How could it be otherwise in a period of keen nationalist sentiment? In all countries, people erected statues of their generals and statesmen, named streets and parks after them, and painted pictures representing stirring events in their national history.

Not all artists, however, shared in this access of patriotism. Some with a keen eye for truth drew pictures of what they saw. The Frenchman Honoré Daumier (1808–1879), like the novelists Dickens and Balzac, preferred to concentrate upon the life and foibles of the middle

classes and was one of the greatest masters of caricature who ever lived. He satirized the smug complacency of the French townsmen and the corruption in law courts at a time of growing industrialism. George Cruikshank (1792–1878) held much the same position in England. He depicted politicians of every kind with perfect impartiality. From his caricatures, we learn the shortcomings of merchants, army men, lawyers, legislators, the clergy, and, in fact, men from every walk of life. Cruikshank drew many of the familiar illustrations for Dickens's novels.

FIG. 120.—"Middle Class Passengers," by Daumier. (*Courtesy of the Metropolitan Museum of Art.*)

The Pre-Raphaelite group of painters, which came into existence in 1848, exerted much influence upon art and artistic taste and conceptions in England. Tired of the adherence to old rules taught in the art schools of the day, younger painters of talent such as William Holman-Hunt, Dante Gabriel Rossetti, and John Everett Millais placed themselves under Ford Madox Brown, an artist of independent taste also discontented with the decadent formalism of the art schools. The group called themselves "Pre-Raphaelites" because they would have nothing to do with rules based on the work of Raphael, Leonardo da Vinci, and later artists and insisted upon emphasizing truth and candor as they saw it expressed by the artists of Italy before 1500. The Pre-Raphaelites

were romantic; their pictures present an ideal conception of landscape and abound in religious feeling. Though composed of able artists, the brotherhood possessed no first-rate master who could give the movement a decisively creative impulse. Edward Burne-Jones's "Merciful Knight" idealizes the medieval conception of knighthood. Holman-Hunt's "Light of the World" shows the Pre-Raphaelite aesthetic interest in religion.

William Morris (1834–1896) was one of the most influential of the Pre-Raphaelites. As a student, he thought of becoming a priest but transferred his interest to the study of medieval art and poetry. He was depressed by the ugly houses and churches of the industrial age and detested the inartistic products of factories, whether clothing, glass, tiles, furniture, carpets, tapestries, or wallpaper. Hence, he became an ardent upholder of the Pre-Raphaelite creed, painted pictures in the medieval manner, imitated medieval poetry, and commented on medieval conditions, which, however, he idealized altogether too much.

Fully as influential as Morris was John Ruskin (1819–1900), a Scot, educated at Oxford, who became the leading artistic influence in English thought. He hated what he conceived to be the blighting influences of industrialism; the machine age appeared to him as the most destructive force of civilization. He opposed the ideas of the Manchester group of economists who emphasized the "economic man" and believed that "enlightened selfishness" was the chief motive behind civilization. Ruskin demanded that industrial workers should be accorded economic justice. Being creators of wealth, they should be trained, educated, and pensioned. Ruskin started giving lectures to the lower classes in the slums, endeavoring to enrich their lives by imparting to them some appreciation of beauty. He held that great art is great because it is in the service of moral ideas. Of his collected lectures, *Modern Painters* deals with the artists of Italy, *Stones of Venice* is an appreciation of the Gothic art of Venice, and *Seven Lamps of Architecture* contains his ideas about architecture.

One notable consequence of the revival of interest in medieval culture due to the Romantic movement to which the Pre-Raphaelites belonged was the revival of Gothic architecture. In France and other countries on the Continent, it became the fashion to construct buildings after the Gothic manner, a practice stimulated in England by the zeal and example of the Pre-Raphaelites and the energy of John Ruskin. Soon Gothic structures began to rise in many cities and especially in America, where new buildings were needed to accommodate the needs of a rapidly growing society, an impulse that appears by no means exhausted at the present moment. At first, Gothic architecture was not well understood; architects were content to copy a few incidental features of

medieval Gothic buildings but did not master their structural secrets. The romantic affection for Gothic architecture is shown in Victor Hugo's *Hunchback of Notre Dame.* Augustus Pugin (1812–1852), an Englishman, also conducted enthusiastic propaganda for the Gothic style that had so long been despised. But it was the Frenchman Viollet-le-Duc (1814–1879) who carefully studied Gothic architecture and traced its historical development in his *Dictionary of French Architecture from the Eleventh to the Sixteenth Century* (1854–1868), a work that served as an authoritative guide for architects who wished to erect Gothic edifices. So Gothic architecture, restored to honor, took its place beside the various forms of classical structure that had been built since the Renaissance.

Although Gothic ideas appealed to the romantic spirit of a period that longed to study medieval culture and even return to medieval conditions, they were little more than a supplement to the classical conceptions that had arisen with the Renaissance and were deeply rooted in the life and thought of western Europe. Some Romanticists preferred to return to the pure Greek idea of art and ignore medieval Gothic artistic conceptions entirely. A remarkable revival of classical building took place. It was not unusual to erect a building combining both Gothic and classical styles. The church of the Madeleine in Paris, constructed on the severe lines of a Doric Greek temple, is a conspicuous example of modern classical architecture. The Arc de Triomphe in Paris, inspired by the triumphal arches of classical Roman times, expresses the proud and romantic nationalism that dominated art whenever the state took an interest in building. The classical and the Gothic as well as the Renaissance tradition flourished side by side, each expressing something of the complex life and thought of the age.

Music. The forces that determined the character of literature and painting also molded musical expression. Romanticism had begun with composers like Schubert, Weber, and Mendelssohn, as we have noted (see Chap. XLI). Their successors during the next two generations followed their example and fully expressed popular romantic ideas. Music became sentimental and frequently melancholic. Mournful chords were employed. Woodland themes became popular, and stirring religious and historical episodes presented in operas never failed to win approval. In this age of tense patriotism, the nationalist sentiment in music was ever prominent. National anthems appeared in every country, witness the German *Deutschland, Deutschland über Alles* and the American *Columbia, the Gem of the Ocean.* Music became national; it no longer was European.

The German Richard Wagner (1813–1883) was one of the most outstanding and nationalistic of all composers. His life coincided with the intellectual movements and events that resulted in the unification

of the German people. Born in the year of the Battle of Leipzig, he heard, as a youth, the nationalist talk current in the country, learned about the scholarship of the Romantic movement in Germany, and witnessed the wars in which Prussia succeeded in bringing all Germany under one rule. Wagner possessed a unique musical genius, with which he interpreted the German past in a completely romantic and individual fashion. Among his great operas are *The Flying Dutchman*, *Lohengrin*, *Tannhäuser*, *The Meistersingers*, *The Valkyrie*, *Rhinegold*, *Siegfried*, *Parsifal*, and *Tristan and Isolde*. His music is not only beautiful but intensely German.

Frédéric Chopin (1810–1849), a Pole, felt the stirring emotions of thwarted nationalist sentiment. The Polish rebellion that occurred when he was twenty-one years of age so crushed Polish liberty that it seemed completely buried. With a heavy heart, Chopin left Poland as an exile and took up his residence in Paris, where he died from tuberculosis. His music is characterized by a romantic melancholy that no doubt sprang from his shadowed life. One of the greatest masters of the piano, he wrote compositions remarkable for finish of detail, delicate nuances, and subtle charm.

Franz Liszt (1811–1883), the most famous pianist of his day, brought the art of piano playing to the highest state of perfection. For 18 years he traveled in Europe, everywhere hailed as the greatest of masters. He was followed by many pupils, who developed his ideas and methods. He was a Hungarian by birth, and his romantic sentiments turned to the music of his native land. Of his compositions, the *Hungarian Rhapsodies* mark the first introduction to Europe of the folk music of Hungary.

Among French composers, three will be noted here. The first was Hector Berlioz (1803–1869) the author of a cantata, *The Damnation of Faust*, founded on Goethe's *Faust*. Charles Gounod (1818–1893), the author of much sentimental music, produced two romantic operas—*Faust* and *Romeo and Juliet*. Georges Bizet (1838–1875) wrote *Carmen* and *L'Arlésienne*, which became extremely popular. All three composers well reflect the Romanticism of the time.

The greatest master of Italian opera during this period was Giuseppe Verdi (1813–1901), who produced twenty-six operas. His most noteworthy productions are *Rigoletto*, *Il Trovatore*, *La Traviata*, *Aïda*, *Otello*, and *Falstaff*.

Humanitarian Movements. Romantic and idealistic ideas expressed in literature, art, and music likewise exercised a practical influence in the life of the time. The humanitarian motive, which we have repeatedly noticed in the foregoing chapters, remained a positive force. A sustained protest against slavery arose in Europe and America and ultimately led to complete emancipation. We have learned how the

slave trade had been a chief source of wealth during the sixteenth and following centuries. This traffic smote the conscience of humanitarians, who supported an active agitation against it. Thomas Clarkson (1760–1846), a student at Cambridge in 1786, wrote a prize essay entitled *An Essay on the Slavery and Commerce of the Human Species, Particularly in Africa*, which proved the beginning of a lifelong effort to crush the evil. He associated with a group of philanthropic London Quakers who thought as he did about slavery. Clarkson traveled over England collecting information and wrote antislavery tracts revealing the brutal character of the traffic. Parliament began to give attention to the problem. William Wilberforce (1759–1833) warmly supported Clarkson's pleas in spite of opposition shown by the people whose wealth depended upon the inhuman business. A number of restrictive measures were passed, and in 1808 the importation of slaves into English lands and colonies was prohibited. The Anti-Slavery Society was formed in 1823; its members, among whom were Clarkson and Wilberforce, demanded complete emancipation of slaves. A bill to accomplish this purpose, passed by Parliament in 1833, freed 800,000 slaves and carried an appropriation of $100,000,000 as compensation to the owners of slaves. This struggle for the freedom of the slave had years before evoked the following sonnet from that lover of liberty, the poet Wordsworth:

> Clarkson! it was an obstinate hill to climb:
> How toilsome—nay, how dire—it was, by thee
> Is known; by none, perhaps, so feelingly:
> But thou, who starting in thy fervent prime,
> Didst first lead forth that enterprise sublime,
> Hast heard the constant Voice its charge repeat,
> Which, out of thy young heart's oracular seat,
> First roused thee.—O true yoke-fellow of Time,
> Duty's intrepid liegeman, see, the palm
> Is won, and by all Nations shall be worn!
> The blood-stained Writing is for ever torn;
> And thou henceforth wilt have a good man's calm
> A great man's happiness; thy zeal shall find
> Repose at length, firm friend of human kind!

The English example in freeing slaves was followed by other European lands—Portugal in 1858 and the Netherlands in 1863. In America, moral sentiment against slavery grew steadily from the opening of the century, and the American Colonization Society was formed to return negroes to their native Africa. In 1821, it sent the first group to Liberia. Soon an extensive antislavery literature appeared. Lowell protested against slavery and the attitude toward negroes in the southern states. "There is nothing more sadly and pitiably ludicrous in the motley farce

of our social system than the prejudice of color," he wrote in his *Anti-Slavery Papers*. Although he did not approve the violent methods of abolitionist agitators like William Lloyd Garrison, he sympathized with their purpose. Lowell's poems addressed to Garrison and Charles Turner Torrey, or "Martyr Torrey" as he was called because he died from neglect while in prison, reveal the poet's humanitarian impulse. Longfellow wrote feelingly about slavery as, for example, in *The Slave in the Dismal Swamp*.

In the dark fens of the Dismal Swamp
The hunted Negro lay;
He saw the fire of the midnight camp,
And heard at times a horse's tramp
And a bloodhound's distant bay.

Whittier also protested against the injustice inflicted upon slaves. His *Slave-ships* opens with the following ghastly scene:

"All ready?" cried the captain;
"Ay, Ay!" the seamen said;
"Heave up the worthless lubbers,—
The dying and the dead."
Up from the slave-ship's prison
Fierce, bearded heads were thrust:
"Now let the sharks look to it,—
Toss up the dead ones first!"

Corpse after corpse came up,—
Death had been busy there;
Where every blow is mercy,
Why should the spoiler spare?
Corpse after corpse they cast
Sullenly from the ship,
Yet bloody with the traces
Of fetter-link and whip.

Many a reader wept over the flight of Eliza and the death of Uncle Tom as described in *Uncle Tom's Cabin*. Published in 1852, this novel hastened the Civil War (1861–1865), in the course of which, on Jan. 1, 1863, the slaves were freed by a presidential proclamation.

Feminism, another aspect of the humanitarian movement, received much attention from writers. Its object was to place women on a complete equality with men in personal, social, economic, and intellectual matters. Women's sphere of influence had been the home; their education remained rudimentary. Care of the family absorbed them; mothers made clothing, preserved foods, churned butter, and discharged a multi-

tude of tasks that today are performed by factories. Legally, women were restricted in a variety of ways. For example, in many states of the Union, property inherited from a wife's family belonged to her husband. Such conditions aroused rebellious sentiments and vigorous opponents. Elizabeth Cady Stanton (1815–1902) of New York became an anti-slavery agitator and champion for woman's rights. When she was married, she insisted that the word "obey" be left out of the ceremony. She became acquainted with Lucretia Mott (1793–1880), a Quaker leader, an active philanthropist and ardent reformer. In July, 1848, they held the famous Woman's Rights Convention in Seneca Falls, N.Y., which demanded suffrage for women. This seemed a bold idea even to Lucretia Mott, who exclaimed to Mrs. Stanton, "Why, Lizzie, thee will make us ridiculous!" Soon these women were joined by Susan Brownell Anthony (1820–1906), another determined advocate of justice for women. They lectured on woman's rights, wrote books, and initiated legislation favorable to women. Progress was slow as they met with opposition and ridicule. But changing social and industrial conditions helped them; more and more women were becoming self-supporting. The invention of the typewriter helped many of them to earn their own living and even to go into business for themselves. The state of Wyoming granted the right to vote to both sexes in 1869, and four other states had followed its example by 1912. The First World War encouraged the movement. Consequently, the Nineteenth Amendment to the Constitution giving women the right to vote in national elections was easily ratified in 1920. By this time, women had won similar rights in Norway, Sweden, Denmark, the Netherlands, and England. Today (1939) legal obstacles that kept women out of public life have vanished everywhere in western Europe except in some of the Latin countries.

Education. A demand for popular education was another characteristic of the nineteenth century. The Industrial Revolution with its technological innovations had brought about many social changes; the development of scientific knowledge led to the organization of public-health and other public services. State and society became more and more democratic. Under these circumstances, it became necessary for citizens who possessed the power to guide public policy by means of the ballot to be educated. Popular education was stressed; its cause was championed by humanitarian men and women. Of course, there had been schools in medieval and early modern Europe and in the American Colonies, but these were usually supported by tuition fees paid by parents. Education was by no means universal because not all parents could pay for the education of their children. Furthermore, many believed that it was not necessary for children to be instructed in any but the most practical subjects such as a minimum of reading, writing, and arithmetic.

No doubt, the schools of a hundred years ago often were good, but they did not educate all children. Hence arose the demand for free education provided and controlled by the state.

Massachusetts was the first state in the Union to organize a state educational system. Horace Mann (1796–1859), a teacher of Greek and Latin at Brown University, was responsible for the Massachusetts education law of 1837, which provided for a state board of education of which Mann became the secretary. He required annual teacher's conventions, established normal schools for the training of teachers, and published the *Common School Journal*. Before Mann began his labors, about half the children of the state received no education, and in many districts the length of the school term was only 2 or 3 months a year. Mann induced the Massachusetts legislature to pass an act requiring a minimum of 6 months in each year. Prominent men helped him by speaking and writing in his support, and the example set by Massachusetts was watched with interest throughout the United States. State governments asked Mann for advice and acted upon it. Henry Barnard (1811–1900) went to Switzerland to observe the methods of Pestalozzi's pupils. On his return, he induced the Connecticut legislature (1839) to create an educational organization patterned after that of Massachusetts. Barnard rendered similar services to elementary education in Rhode Island. Other states followed the example of Massachusetts, Connecticut, and Rhode Island. Soon, free public elementary education became established in every northern state of the Union. The southern states were slower in establishing public-school systems, being hampered by the effects of the Civil War. The forces active in creating a common school system in the United States were also triumphant in Europe, where especially successful elementary schools were established. Illiteracy has almost entirely disappeared in Scandinavia and the Netherlands. Today, all countries recognize the need of having a literate population; the provision for elementary education has become one of the chief tasks of modern states.

Secondary education had been emphasized in European countries ever since the French Revolution. The advanced school, or gymnasium (*lycée* in France), in which Greek, Latin, and mathematics formed the chief part of the curriculum, was firmly established in most countries. But such schools were lacking in the United States before 1840, their place being taken by private academies. Gradually the demand grew for public tax-supported high schools. Again the leader, Massachusetts in 1827 passed an act requiring the establishment of a high school in every town having at least five hundred families. Some excellent schools like the English Classical School of Boston were established under this act, but only a few towns complied with the law. There was much opposition

to high schools, for many people could not see the need of them. After the Civil War, however, they multiplied rapidly and finally became an indispensable part of the school system of every state. Meanwhile, the gymnasiums and *lycées* multiplied in Europe until almost every town had one. Another type of school to be established was modeled after the gymnasium. It dropped Greek and Latin and substituted the natural and biological sciences and modern languages.

A striking feature of modern education was the rapid growth in the number of universities, due partly to the extraordinary progress in scientific knowledge. The natural sciences became the basis of industrial processes, and as population grew there was a greater need for laboratories, libraries, and teachers. No other institution is so well adapted to teach the arts and sciences as is a university. As wealth increased, more universities were established. New ones were created in the European countries and in China, Japan, and India. A phenomenally large number of colleges and universities was opened in the United States, where virtually every state established a university. At present, more and more subjects are being taught, and universities are constantly appealing to a wider range of interests. While teaching has remained a most important branch of university work, today independent investigation has become at least as important.

Feminism, which aimed to extend to women the privileges that men enjoyed, early resulted in the founding of women's colleges. Emma Willard (1789–1870) founded the Female Seminary at Troy, N.Y., in 1823. This was followed in 1837 by the Mount Holyoke Seminary established by Mary Lyon (1797–1848) at South Hadley, Mass. Women's colleges were ridiculed, being referred to as "she colleges." But the movement gained ground, especially after the establishment of public high schools, which in many cases were coeducational. Oberlin College in Ohio was the first college to admit women on the same terms as men (1833). Vassar College, established in 1865 at Poughkeepsie, N.Y., was the first women's college. Other exclusively women's colleges were founded from time to time, but the opening of the state universities to women checked the movement. Today in America, women students are accepted in nearly all branches of study including law, forestry, and engineering. In Europe, education for women progressed more slowly, but by the opening of the First World War women were admitted to most European universities.

Education of the deaf and blind also became the subject of humanitarian attention during the nineteenth century. Some notable efforts had been made as early as 1600 to educate the deaf, and before 1800 there were a few schools for the deaf and blind in France, Germany, the Netherlands, and England. In the United States, Kentucky established

the first state training school for the deaf. Gradually, schools for the deaf, blind, and mute were established in the United States and Europe. Great progress was made in teaching the blind to read books and the deaf to follow conversation by reading lips.

Romantic idealism—the passion for freedom, patriotic expression, humanitarian reform, and a keen appreciation for nature—thus swayed the emotions of Europeans and Americans. It modified literature, art, and music and profoundly stirred benevolent sentiments, thus giving rise to new humanitarian movements. Religion also was deeply influenced by the idealism of the Romantic Age, but consideration of this aspect of Romanticism is deferred to another chapter. By 1848, however, it was obvious that the optimistic idealism of romantic inspiration, beginning with the Wesleys in England and Rousseau in France, was drawing to a close. A new note—that of scientific naturalism, inspired by the phenomenal growth of experimental science—was rapidly supplanting it.

FOR FURTHER READING

Barnes, H. E.: *The History of Western Civilization*, Vol. II
Bate, Percy: *The English Pre-Raphaelite Painters*
Binkley, R. C.: *Realism and Nationalism*, 1852–1871
Coupland, Reginald: *Wilberforce, A Narrative*
Dawson, Christopher: *Progress and Religion*
Griggs, E. L.: *Thomas Clarkson, The Friend of Slaves*
Hayes, C. J. H.: *A Political and Cultural History of Modern Europe*, Vol. II
Hazen, C. D.: *Europe since* 1815
Long, W. J.: *American Literature*
Masterman, C. F. G.: *Tennyson as a Religious Teacher*
Moody, W. V., and R. M. Lovett: *A History of English Literature*

Chapter XLIV

NINETEENTH-CENTURY INVENTIONS

Every great invention is really either an aggregation of minor inventions or the final step of a progression.—R. H. Thurston

THE mechanization of industry begun during the eighteenth century was but the prelude to an extraordinary outburst of inventive energy. The foundations of modern mechanical industrial activity had been laid by such innovations as the steam engine, steam railway, steamship, steam-powered factories, and mechanical spinning and weaving. But significant as were the inventions of Kay, Hargreaves, Crompton, Arkwright, Watt, Fulton, and Stephenson, their machines were far from perfect. Subsequent inventors made innumerable refinements that increased the efficiency of the earliest machines beyond anything the original inventors had dreamed possible. Other inventions followed in rapid succession that, taken together, extended mechanization to every aspect of manufacture. Sewing by hand gave place to mechanical sewing; irregular objects such as gunstocks were produced in great quantities by the invention of the profile lathe; electrical power threatened to displace steam power; methods of warfare were revolutionized by the invention of submarines, armored battleships, and new and more effective guns; travel was revolutionized by the airplane and automobile; the news and knowledge were disseminated by telegraph, telephone, radio, and motion picture. Last but not least, ancient agricultural methods were radically changed by the invention of agricultural machinery and the application of scientific ideas derived from chemistry and related sciences. Although invention and the mechanization of industry and agriculture began in England, the movement spread to America and other countries so that the Industrial Revolution truly was a characteristic product of Western civilization to which all nations from Sweden to Italy, from Germany to America, contributed something.

Economic Foundations of American Inventions. America embarked upon an era of territorial growth soon after it won its independence in 1783. The prairies of Illinois, Iowa, Kansas, and Nebraska invited agriculturalists. Northern Michigan, northern Minnesota, and the Rocky Mountains contained rich mineral deposits. Here was a region of inexhaustible, natural wealth offering the necessary economic

foundations for a vigorous nation. People poured into the new territory, converted prairies into flourishing farms, and created states each of which was larger than such small European countries as the Netherlands. Stalwart immigrants came from central Europe and Scandinavia. Their labor and industry helped to create a mighty economic empire. Small wonder that the industrial development and westward movement of the American people evoked the most varied inventive genius.

Benjamin Franklin. The history of invention in America begins with Benjamin Franklin (1706–1790). Born in Boston, he made Philadelphia his home. He established a printing house there and became an important figure in the public life of Pennsylvania. A typical product of the Age of Reason, he was perhaps the most prominent American to give expression to the philosophy of that period. He was a practical man, always taking a common-sense view of affairs. In 1788, he made the following optimistic statement:

> I have long been impressed with the same sentiments you so well express, of the growing felicity of mankind, from the improvement in philosophy, morals, politics, and even the conveniences of common living, and the invention of so many new and useful utensils and instruments; so that I have sometimes wished it had been my destiny to be born two or three centuries hence. For invention and improvement are prolific and beget more of their kind. The present progress is rapid. Many inventions of great importance now unthought of will before that period be produced.

Franklin's discoveries in electricity described in a following chapter were not his only services to science and invention. He invented the "Franklin stove"—a great improvement upon the open hearth to be found in Colonial homes—devised a musical instrument called the "harmonica," produced bifocal spectacles, investigated the nature of fertilizers, and reformed the Colonial postal system.

Woodworking Machinery. In spite of the phenomenal increase in the use of iron for tools and machinery during the eighteenth century, wood remained more important. As America possessed an unlimited quantity of wood in her virgin forests, it was natural that great advances in mechanical woodworking should be made in the United States. Some woodworking machinery had been developed in England by the close of the American Revolution. In 1777, one Samuel Miller secured a patent for the first steam-driven circular saw designed to cut wood. Soon after, General Samuel Bentham (1757–1831), brother of Jeremy Bentham, the political philosopher, produced several machines for "planing, molding, rabbeting, grooving, mortising, and sawing both in coarse and fine wood, in curved, winding, and transverse directions, and shaping wood in complicated form." The Napoleonic Wars especially stimulated English

industry, and Bentham's machines met the urgent demand for weapons. For his laborsaving machines Bentham received as much as $100,000.

But it was Thomas Blanchard (1788–1864) of Massachusetts who produced the most ingenious invention in woodworking machinery. He was a stammerer and was shy in his manner, and no one appreciated his mechanical cleverness. Young Thomas used to amuse his friends with miniature windmills and water wheels whittled by hand. At that time, it was the custom for young people at parties during the winter evenings to pare and eat apples. When but thirteen, Blanchard invented a machine that pared more apples than twelve of his opponents were able to do by hand. Blanchard's great triumph was his profile lathe, which successfully turned such irregular pieces of wood as gunstocks. Blanchard began by adapting the lathe as it had been improved by Maudslay. To it he added a swinging frame carrying a gunstock, which served as the pattern. The revolving pattern turned a wheel, which guided a cutter operating upon a rough piece of wood turning out exact duplicates of gunstocks, shoe lasts, and ax handles.

Illumination by Gas. Illumination by gas appeared with the opening of the nineteenth century. Chemists had been familiar with illuminating gas for some time, but no practical use had been made of it until William Murdock (1754–1839) succeeded in distilling the vapor from coal and lighted his house with it. Employed in the engine-building factory of Matthew Boulton and James Watt near Birmingham, in 1803 he also lighted the buildings of his employers by this means. Soon gas was used in lighting cotton mills. It was even suggested that gas might light streets, and a Bohemian named Frederick Winsor (1763–1830) began to promote such a scheme. Sir Walter Scott thought Winsor was crazy; even the chemist Sir Humphry Davy believed that lighting by gas could not be a success. But Winsor persisted and in 1807 lighted one side of Pall Mall in London to the astonishment of the public, who could not understand how gas carried long distances through mains burned brilliantly with great heat yet without warming the pipes.

Gradually, after much experimentation, lighting by gas became common. At first, there was no way to control the use of gas. Samuel Clegg (1781–1861), a friend of William Murdock and also an employee in the factory of Boulton and Watt, invented the commercial gas meter. Gas companies now were able to charge for the quantity of gas consumed. In America, gas was first used for lighting purposes in Baltimore in 1817. New York followed in 1823, Philadelphia 10 years later, and other cities shortly thereafter.

Sewing Machinery. From time immemorial, sewing had been a laborious task consuming much of woman's time. Clothing had to be sewed by hand with needles, invented as long ago as the Neolithic Age.

The poet Thomas Hood (1798–1845) has perpetuated the memory of this feminine drudgery in his *Song of the Shirt.* His humanitarian feelings were stirred by the sufferings of the poor who eked out a living by plying the needle.

Work—work—work!
From weary chime to chime,
Work—work—work—
As prisoners work for crime!
Band, and gusset, and seam,
Seam, and gusset, and band,
Till the heart is sick, and the brain benumb'd,
As well as the weary hand.

A number of inventors had tried to produce a sewing machine with varying results. Elias Howe (1819–1867), a native of Massachusetts, was the first inventor to bring a successful sewing machine before the public. His device sewed with remarkable precision, producing a good lock stitch. Its distinguishing features were a shuttle and an eye-pointed needle. Yet the public was slow in adopting his invention. Many a shop owner feared that mechanical sewing would deprive journeymen of their bread. Howe took out his patent in 1846, but infringers tried to prove priority. One of these, Isaac Singer (1811–1875), in 1851 produced a sewing machine operated by a treadle, a definite improvement on hand operation destined to dominate the sewing industry until the application of electric power in recent years.

Development of Printing. By the opening of the Industrial Revolution, printing, "the art preservative of all arts," had progressed little beyond its original development in the Rhine Valley at the close of the Middle Ages. In 1829, Samuel Rust, an American, produced his improved Washington press. This machine, made entirely of metal, was operated by hand, but on it two men were able to print 250 sheets per hour. The first steam-driven printing press using cylinders had been invented in 1813 by two Germans, Friedrich König (1774–1833) and Andrew Bauer (1783–1860). The cylinder carrying the type, inked by means of rollers, printed 1,800 sheets per hour. Then Richard Hoe and Company of New York installed a press in the office of the *Philadelphia Ledger* in 1846. It had four cylinders that printed 8,000 copies per hour. Speed was an important consideration in the estimation of publishers, and so more and more rapid presses were evolved. The Octuple press produced by Richard Hoe and Company was the mechanical marvel of the close of the nineteenth century. This gigantic machine printed 96,000 papers of eight pages per hour and cut, pasted, folded, and counted them automatically. It weighed over 60 tons, was composed

of more than 16,000 parts, and ran 50 miles of paper over its rolls in 1 hour. Since 1900, the presses have become larger, and the number of papers printed per hour has increased fantastically.

The chief problem confronting newspaper publishers was the cost and delay of setting type by hand. This was solved in 1884 by the invention of the linotype by Ottmar Mergenthaler (1859–1899), an American of German extraction. By manipulating a keyboard like that of a typewriter, the typesetter turns out each line of type in one piece ready for printing, thus eliminating a number of compositors. This laborsaving marvel has been described as the "most ingenious piece of practical mechanism in existence." The monotype, invented by Tolbert Lanston (1844–1913), resembles the linotype but instead of turning out lines of type produces separate letters. Most of the typesetting today is done on linotypes or monotypes, employed in setting up books and magazines as well as newspapers.

Paper-manufacturing Machinery. A rapid increase in the demand for paper resulted from the improvements in printing. Even before the opening of the nineteenth century a paper-manufacturing machine appeared in France. Other inventors improved upon this machine, the rights of which were purchased by Henry Foudrinier (1766–1854), an English industrialist of French parentage. The name of Foudrinier is perpetuated in the name of the most important machine still used in the manufacture of paper. Materials like rags or wood are first reduced to pulp, which is treated chemically for the type of paper desired. The pulp is spread evenly between cloth aprons, drained, and partly dried. Passed through a series of rollers, it is subjected to as much pressure as may be necessary to give the desired thickness. A Foudrinier machine is practically automatic, the only workers needed being those who put the raw materials into the machine, watch the operations, and take care of the finished paper as it leaves the machine in large rolls weighing several hundred pounds each.

Typewriters. While the production of books and newspapers was rapidly becoming a perfected industrial art, the question was raised whether a writing machine could be invented. The credit of inventing a practical typewriter belongs to Christopher Sholes (1819–1890) of Milwaukee, Wis. At first Sholes worked with another mechanic, Samuel Soule, and together they produced an automatic numbering machine. They next turned their attention to a "writing machine," patented in 1868. Finally, in 1873, the Remington factory in New York bought Sholes's rights and began manufacturing typewriters. The Remington typewriter still occupies an honored place among writing machines. Since then, many improvements have appeared, the greatest no doubt being a model that writes visibly, the invention of John Underwood.

RUBBER. Before Sholes patented his typewriter, rubber-working processes had been so developed that rubber had become an important industrial article. The trees from which "India rubber" is produced grow profusely in South America. When exposed to air and treated with heat and smoke the sap coagulates and becomes pliable, producing the "rubber" of innumerable uses. When rubber was first brought to England, the chemist Joseph Priestly called attention to its usefulness in erasing pencil marks. Henceforth, it was called "rubber."

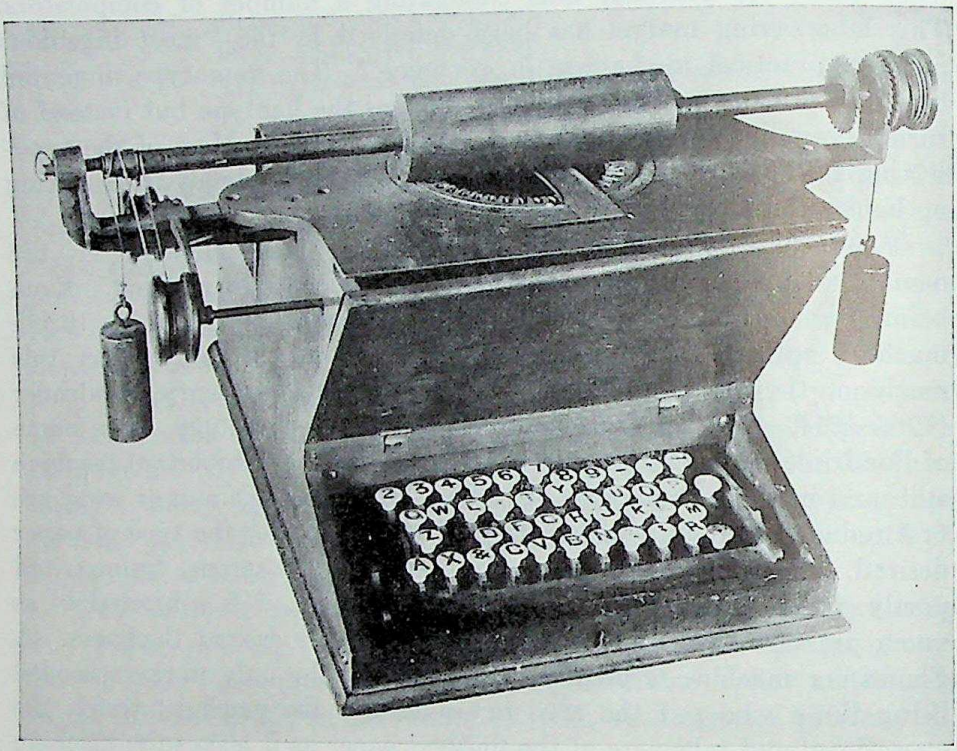


FIG. 121.—Scholes's typewriter. (*Courtesy of the Remington Rand Company.*)

Rubber was used extensively during the early part of the nineteenth century in the making of waterproof wearing apparel and footwear. One manufacturer, Charles Macintosh (1766–1843), spread it between layers of cloth from which he manufactured rainproof coats, popularly known as "mackintoshes," but the sticky rubber melted so easily that garments made from it became unwearable during the hot summer months.

Although deeply interested in the possibilities of rubber, manufacturers failed to make any progress in manipulating the gum until Charles Goodyear (1800–1860) of Connecticut, a self-taught and ingenious person of rare determination, solved the problem of properly curing rubber. One man said of him, "If you see a man with an India-rubber coat, India-rubber shoes, an India-rubber cap, and in his pocket an India-rub-

ber purse with not a cent in it, that is Charles Goodyear." He discovered that the stickiness of rubber was eliminated by heating it with sulphur and that the application of a proper amount of heat produced a tough, hard material which would not melt in hot weather or crack in cold. The latter process is known as "vulcanization." Demand for rubber goods grew rapidly; but Goodyear was unable to profit from this, for competition began infringing upon his rights and lawsuits impoverished him. Nevertheless, the name of Goodyear remains prominently associated with the rubber industry of today.

PHOTOGRAPHY. The art of photography was built upon the happy coincidence of a number of the arts and sciences during the nineteenth century. Spectaclemakers like Lippershey and Jansen had prepared the way, and microscope makers contributed their knowledge. Optics, physics, and chemistry combined to enable inventors to produce a method of making pictures. Thomas Wedgwood (1771–1805), son of the famous potter, was the first to produce contact prints; that is, he made pictures of such objects as leaves and flowers by placing them upon paper, glass, or leather made sensitive to sunlight by a coating of silver nitrate. But silver nitrate surfaces when exposed to the light discolor, and so the pictures faded rapidly. Wedgwood tried to find some chemical that would permanently fix the image, but neither he nor his friends James Watt, Joseph Priestley, and Humphry Davy were able to solve the problem.

Joseph Niepce (1765–1833), a Frenchman, discovered the secret of making permanent photographic images. After fruitless investigation involving great expense, he learned that bitumen of Judea, soluble in certain solutions, became insoluble when exposed to light. He covered a tin plate and exposed it in a box (Latin, *camera*), and after exposure he washed the plate in essence of lavender, in which the bitumen of Judea is soluble. He found that the light parts of the picture were insoluble and other parts readily washed away, the outlines thus standing out with great clarity. Other searchers suggested improvements, and many new ideas were advanced. A Frenchman, Louis Daguerre (1789–1851), made the first successful use of hyposulphite of soda as a developing agent. The memory of Daguerre's invention has been perpetuated in the "daguerreotype" so popular in our grandfathers' day.

A London sculptor named Frederick Archer (1813–1857) invented a new photographic process in 1851 by applying the sensitizing liquid mixed with collodion to glass plates. This cumbersome "collodion wet-plate process" was supplanted by a dry-plate method invented in 1871 by an Englishman, Richard Maddox, who substituted a base of gelatin for collodion. When dried, plates lost none of their effectiveness. George Eastman (1854–1932), an American, abandoned glass and used

a celluloid roll wound on a spool. He also invented the "kodak," a model of compactness and convenience. "You press the button; we do the rest" became the advertising slogan of the Eastman Kodak Company, and kodak became a new word in the English language. Meanwhile, a number of inventors had busied themselves with color photography, but with slight success. In 1891, Gabriel Lippmann (1845–1921) perfected a process that proved only moderately successful; but many improvements followed, and today color photography has attained a high degree of perfection.

The invention of motion pictures is one of the marvels of photography. Its basic principle is the phenomenon of the persistence of vision, well known to physicists. Identical pictures shown in sufficiently rapid succession produce an impression of continuity. Inventors speculating on this problem had produced some ingenious devices. A California photographer named Eadweard Muybridge (1830–1904) so arranged a series of twenty-four cameras as to photograph a running racehorse. Threads operating a shutter were stretched across the horse's path. The result was a series of pictures showing a running horse. If enough pictures could be taken and moved in rapid succession across a beam of light from a lens, an animated picture would result. Making use of experiments by predecessors, Charles F. Jenkins (*b.* 1867) finally produced a motion-picture projector, which he exhibited in 1894. This machine was repeatedly improved upon until an efficient motion-picture projector appeared. Finally, the Gabriel Lippmann color photographic process was applied to motion pictures. After much experimentation, the present relatively successful technicolor motion picture made its appearance.

Among recent improvements in motion pictures is the talking picture —an innovation that Thomas Alva Edison (see also page 784) had projected but abandoned. Speech waves recorded on the film as light and shade reproduce original sounds accurately. Soon talking pictures supplanted the silent motion picture. A further development in motion pictures is the animated cartoon. A producer can illustrate anything he wishes by drawing a number of pictures in a series. When these are filmed and run through a projector, the result is an animated cartoon. Windsor McKay was the first to produce such a cartoon, entitled *Gertie the Dinosaur*, which required over ten thousand sketches drawn by hand. Such pictures, immensely popular, have become definitely a part of the art of the motion picture.

Improvements in Metallurgy. The steady flow of inventions and the progress of industrialization demanded great quantities of iron and steel, and manufacturers were pushed to their utmost to satisfy market demands. The puddling process invented by Henry Cort in 1784 had

cheapened the manufacture of steel by the use of rolls that eliminated hammering. But output remained limited until Henry Bessemer (1813–1898), an able mechanic and inventor, produced a new process. In 1856, he discovered that melting iron was decarbonized quickly by the forceful injection of air into a pear-shaped "converter." By mixing a quantity of ferromanganese with the molten iron, he produced a tough steel that could be rolled without breaking. This process, which revolutionized the manufacture of iron, remains the technical foundation upon which the great steel industry rests.

Improvements in Railroading. Although the railroad was first developed in England, many important inventions relating to it were made in America, where distances are so great that rapid transit is highly desirable. Wood rails gave way to iron, and more powerful locomotives appeared to haul the ever-increasing loads. Passenger carriages also improved. At first, these were patterned after the familiar stagecoaches; the passengers sat inside or on the top, where they were exposed to wind, rain, and sun as well as to the smoke and sparks from the locomotive. A number of improvements were made by an engineer named Ross Winans (1796–1877), who placed doors at the ends of cars and arranged seats along the sides. This arrangement, still a feature of American railroad cars, distinguishes them from European cars, which are divided into compartments each opening upon a passage on the side.

Although travel by night was necessitated by the great distances, little attention was paid in the early days of railroading, to the comfort of passengers. Bunks were placed along the sides of cars from which the seats had been removed. There was no privacy, nor were there any facilities for washing. That there was much room for improvement was obvious to George Pullman (1831–1897), a cabinetmaker of New York who settled in Chicago, Ill., in 1858 and built the first two sleeping cars for the Chicago and Alton Railroad. Seats were so constructed as to be readily converted into beds—the upper berths of the swinging type still employed in "Pullmans." Curtains separated the sections and provided some measure of privacy. The cars were an immense success as businessmen found it profitable and convenient to travel while sleeping. In 1864, Pullman produced his first genuine Pullman sleeping car, fully equipped according to the taste of the day with French plate mirrors, handsome chandeliers, decorated ceilings, and a Brussels carpet. In 1868, Pullman introduced a "hotel" car or, as we now call it, dining car.

For years, cars were built of wood, which involved a number of problems. Cars so constructed were likely to be demolished in a wreck and the passengers maimed and killed. Also, there was the danger of fire; it occasionally happened that wrecked cars burned, roasting the trapped inmates to death. The answer to this problem was the modern

steel car, which survived most accidents and protected occupants from splinter wounds or crushing. Another problem that had troubled railroad officials from the beginning was the question of braking a train. For a time, each car carried an independent braking device, which made it impossible to apply the brakes simultaneously on all cars. George Westinghouse (1846–1914) of Schenectady, N.Y., invented a system of braking an entire train. Making use of the principle of compressed air, he developed a device operated by the locomotive engineer that applied the brakes simultaneously to every wheel. Westinghouse was one of America's most prolific inventors. In 48 years he took out over four hundred patents, many of which, like the air brake, proved exceedingly valuable to industry.

The freight car was another characteristic invention of American railroading. The modern closed boxcar, flatcar, and coal car developed from the primitive car patterned on the wagon. Refrigerator cars were produced by Gustavus Swift (1839–1903), who concluded it was cheaper to transport meats from the Middle West to New York than to ship live animals. The first refrigerator cars, invented in 1875, contained ice boxes that chilled the air and kept meat products fresh. Like freight and passenger cars, refrigerator cars were eventually constructed of steel to save damage to and loss of goods in transit.

Ships. The steam engine had not only revolutionized industry and transportation on land but by the middle of the nineteenth century had also changed methods of ocean transport. The first steamship to cross the Atlantic appears to have been the *Savannah*, which sailed from Savannah, Ga., to Liverpool in 1819. This ship, however, relied upon her sails for all but 80 hours of the voyage. Soon other steamships began to cross the ocean. The Cunard Line was inaugurated in 1839 by Samuel Cunard (1787–1865), a native of Nova Scotia. His first ships, made of wood and propelled by wheel paddles, had a speed of 8 knots per hour and consumed 400 tons of coal per day. Such vessels proved defective; they could not withstand the heavy waves and, in addition, were in serious danger from fire. These problems could be solved if ships were constructed entirely of iron, but people were slow to admit the possibility of an iron ship floating. Eventually, a few ships were constructed of iron, notably the *Garry Owen* in 1834. During the great storm of 1837, a large number of wooden ships were destroyed; but the *Garry Owen*, driven ashore, suffered no injuries beyond a few dents. This incident demonstrated the practicability of iron ships and their superiority over wooden ones.

John Stevens, an American inventor, had produced a screw-driven boat in 1804, but engineers did not take kindly to this novel method of propelling ships. John Ericsson (1803–1889), a native of Sweden and

resourceful inventor who spent most of his life in America, produced the first commercially successful screw-propelled ship. He also invented a fire engine that threw a stream of water as high as a house. His steam locomotive, the *Novelty*, competed with Stephenson's *Rocket* in 1829 but failed to complete the allotted distance because it broke down owing to hasty construction. The success of Ericsson's screw-propelled *Francis B. Ogden* soon caused shipbuilders to adopt the propeller for all ocean-going ships. Great improvements subsequently were made in the construction of ships. Today we have refrigerator ships, oil tankers,

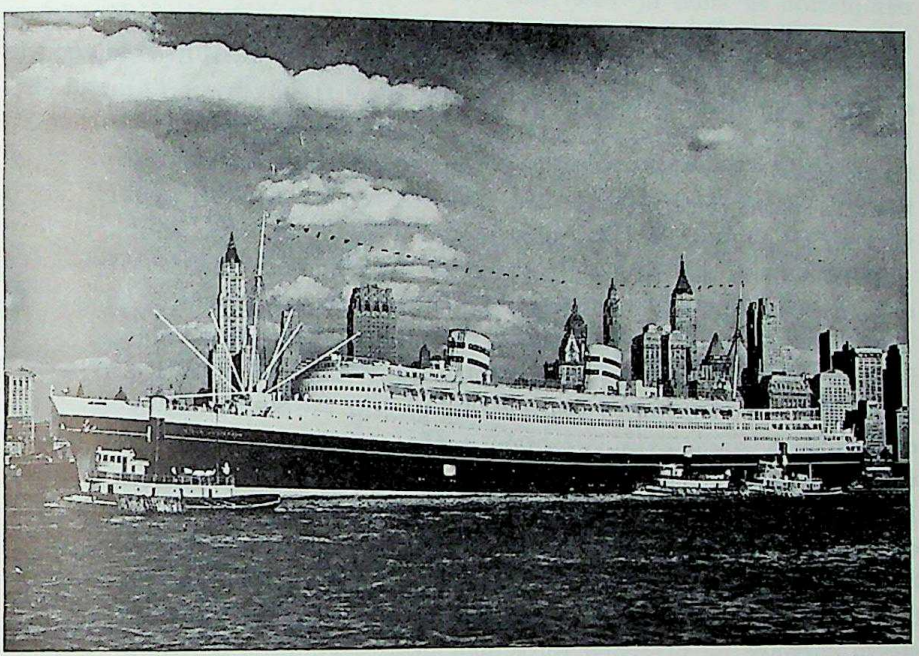


FIG. 122.—The *Nieuw Amsterdam* and the New York sky line. (*Courtesy of the Holland America Line.*)

coal ships, dredges, and many other types. It is a far cry from Fulton's *Clermont* to the de luxe liner *Nieuw Amsterdam*.

Naval architects at once adapted the new inventions to warships. As early as 1814, Robert Fulton built a steam-driven warship called the *Demologus*, or "voice of the people." In addition to its 20 guns, it had a device for pouring scalding water upon the enemy and a special furnace in which to heat cannon balls, which, it was hoped, would set wooden ships afire. Ironclad floating batteries were used for the first time in the Crimean War (1854–1856), but it was the American *Monitor* that demonstrated conclusively the superiority of ironclad battleships. During the Civil War (1861–1865) the Confederate government equipped the *Merrimac* with armor, hoping to destroy the entire Northern navy

with it. In this emergency, John Ericsson produced the *Monitor*, a floating battery drawing only 11 feet of water. So low did it lie in the water that it was hard to hit, and what little was exposed was plated with armor. Its revolving turret was equipped with rapid-firing guns. The battle between the two iron ships, fought in March, 1862, inaugurated the era of iron ships of war.

The invention of the submarine, like the appearance of ironclad ships, also helped to revolutionize naval warfare. Several inventors, especially Robert Fulton, had been interested in submarines, but the successful completion of such a vessel was left to John Holland (1840–1914), a native of Ireland who had immigrated to the United States. His Irish patriotism led him to experiment with an undersea warship that would destroy the entire British navy! In 1898 the *Holland* was launched in Elizabeth, N.J. It was 53 feet long, weighed 75 tons, and was capable of traveling on the surface as well as below water. Other nations followed the example of the United States; today no navy considers itself efficient without a large number of submarines.

Beginnings of the Automobile. Automobiles effected perhaps even greater changes in transportation than railroads and steamships. The beginnings of the automobile are more ancient than most people imagine. One of James Watt's mechanics, William Murdock, whom we noticed as the inventor of illuminating gas, in 1784 invented a carriage driven by a single-cylinder steam engine. Other inventors produced various types of such vehicles both in England and in America. By 1833, there were some twenty steam-driven vehicles in London, and companies were organized to operate them like stagecoaches; but as there was much opposition to them, Parliament passed its Road Locomotive Act in 1836, which assessed a heavy tax and required that each steam carriage be preceded by a man afoot waving a red flag. These burdens proved too great for the struggling industry, and steam carriages virtually disappeared.

The effective beginnings of the automobile date from the application of the internal-combustion engine operated by oil. Steam was abandoned because steam engines were heavy and smoky and required constant refueling and filling with water. Yet the principle of the gas engine is much like that of the steam engine. Instead of using steam generated by fire, gas is exploded behind the pistonhead. Several inventors contributed to the gas engine. Samuel Brown produced one in 1823 which worked so well that it pumped water out of mines; but it was Nicholas Otto (1832–1891), a German, who produced a really effective gas engine designed, however, for stationary work and not for vehicles.

Gottlieb Daimler (1834–1900), a mechanic in Otto's shops, first adapted Otto's engine to the motorcar. In order to make it practical,

he had to develop such supplementary inventions as the carburetor, water-jacketed cylinders, sliding-gear change-speed mechanism, and V-type engine. A Frenchman named Levassor, who bought the rights to exploit the Daimler patents in France, by 1890 had produced a vehicle containing the essential parts of the modern automobile. Although the automobile was invented abroad and first shown to be a commercial success in Germany and France, automobile production on a large scale first began in the United States. The abundance and excellence of raw materials and the mechanical efficiency of American workmen gradually produced the most remarkable mass-production industrial system in the world. A number of inventors occupied themselves with the problem of producing inexpensive cars; among these were Charles Duryea, Elwood Haynes, R. E. Olds, J. D. Maxwell, John and Horace Dodge, and Henry Ford.

Bicycles and Motorcycles. The manufacture of bicycles played an important part in American industrial history of the nineteenth century. The first bicycles, propelled by riders hitting their feet on the ground, appeared in England about 1800. Called "hobbyhorses," they were much ridiculed. Next, the "boneshaker" of 1869 was propelled by pedals attached to the front wheel and operated by the rider. The modern type, operated by pedals attached to a sprocket wheel and link chain that turns the rear wheel, first appeared in 1879. The first motorcycle was produced in 1885 by Gottlieb Daimler of automobile fame; by 1896, it was estimated that there were at least four million riders in the United States alone. Distances in America were so great, however, that the bicycle and motorcycle proved poor competitors to the automobile, which came to be indicative of American affluence and well-being.

Pneumatic Tools. The principle of pneumatic suction has proved useful in many industrial processes. Benjamin Sturtevant (1833–1890), the son of a Maine farmer, was the most important inventor of pneumatic devices. He produced a machine provided with a suction fan that drew fine particles of dust from buffing machines. Soon suction was employed in pumping liquids and conveying grains, meal, fertilizers, and even course materials like coal. This principle, employed in vacuum cleaners, also became indispensable in ventilating schools, hospitals, hotels, and mines and recently has been made the basis of revolutionary advances in air conditioning.

Progress in Electrical Science. The application of electricity to industry did much for convenience, mobility, and compactness. The work of Ohm, Faraday, and other pioneers was continued in the United States by Joseph Henry (1797–1878). Born in Albany, where he taught mathematics and natural philosophy, he became a professor at Princeton

and finally a director of the Smithsonian Institution, which had been founded in 1846. Himself an industrious investigator, he was the first to use silk-wrapped wire in making electromagnets and to show that a piece of iron could be magnetized at a distance—a fact that was to prove important in the invention of the electric telegraph. No progress was made in the development of this idea, however, until Samuel Morse (1791–1872) attacked it. Morse was an artist who turned his attention to electricity as a result of a chance meeting with a scientist when returning from Europe. While pacing the deck, he evolved plans for the "magnetic telegraph." He knew that an electric current would incite an electromagnet to move a piece of iron near it and that a pencil affixed to the piece of iron would make a mark on paper. Obviously, if a system of electric signals could be invented, messages could be transmitted as fast as electricity could travel.

Morse became professor of art at the newly founded University of the City of New York but devoted much time to experimentation in association with Alfred Vail (1807–1859), who also was interested in electric telegraphy. After perfecting his code, Morse tried to send messages under water through a wire insulated with pitch, India rubber, and hempen thread; and his success showed the possibility of submarine telegraphy. In 1842, Congress appropriated $40,000 to establish a telegraph line from Baltimore to Washington. Messages were successfully transmitted, and the telegraph soon began to bring in money. From such humble beginnings grew the huge system of telegraphic connections that now extend over the earth.

Soon undersea cables were laid between England and Ireland and the Netherlands. A wealthy New York merchant named Cyrus W. Field (1819–1892) believed that a cable between England and North America was feasible. The Atlantic Cable Company, which Field organized, was fortunate in having the technical assistance of William Thompson, better known as Lord Kelvin. A cable of seven copper strands was prepared, embedded in gutta-percha, surrounded with tarred hemp, and sheathed in a coat of heavy iron wires. Four attempts to lay such a cable between Ireland and Newfoundland miscarried; but the undaunted Field persevered, and the fifth attempt was successful. Ocean cables at once proved so remunerative that at least 1,800 cables have been laid providing instantaneous communication with all parts of the world.

While the telegraph was indeed a marvelous invention, the telephone was even more wonderful. Instead of conveying thought by means of dots and dashes, it transmits the human voice itself over vast distances. From his experience in teaching deaf-mutes, Alexander Graham Bell (1847–1922) thought that the electrical transmission of spoken words

was mechanically possible. By studying the effect of sound vibrations on the human eardrum, Bell eventually developed a transmitter. The vibrations cause a metallic disk to tremble, thus starting an electric impulse that reaches a receiver, where it is retranslated into a sound exactly like that of the original voice. In 1881 the American Bell

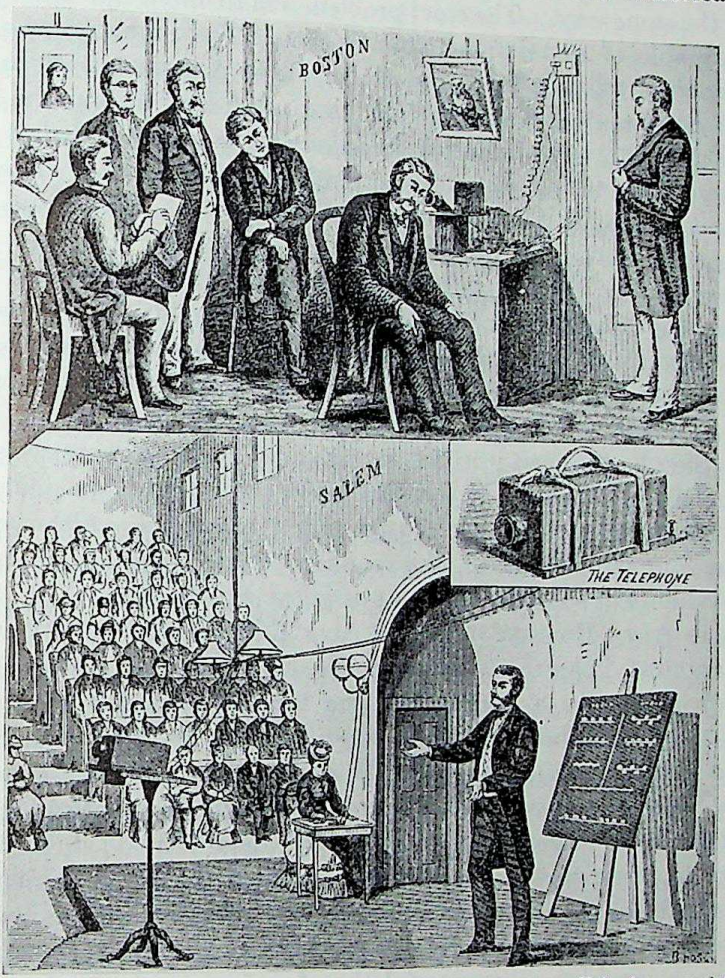


FIG. 123.—The Bell telephone, 1877. (*Courtesy of the American Telephone and Telegraph Company.*)

Telephone Company was organized, and soon telephonic connections were installed throughout America and many foreign lands.

Was it possible to send messages without the use of wires? As early as 1863, Maxwell had advanced the theory that electrical discharges produce disturbances in the ether which spread with the velocity of light, and the existence of such waves was conclusively demonstrated in 1887 by Heinrich Hertz. Guglielmo Marconi (1874–1937), an Italian,

developed a wireless telegraphic device that in 1901 received messages sent across the Atlantic from Ireland to Nova Scotia. Numerous improvements were made, and gradually the wireless became a serious competitor of the older system of telegraphy. Marconi's success stimulated inventors to produce a method of transmitting the spoken word in the same way. The chief problem was to find a continuous wave length capable of sustaining human speech. The inventor who made radio a success was Lee De Forest (*b.* 1873), an American born in Iowa. In 1907, he patented the radio tube that, perfected during the World War (1914–1918), gave radio transmission to the world. Today at our firesides we listen to the speeches and music of distant lands. The world has shrunk; we hear the people of distant Argentina, Italy, and Japan as if they were talking in the next room.

If thought can be transmitted over long distances by means of the telephone, the telegraph, and the wireless, why should it not be possible to do the same with images? This question was asked by Paul Nipkow (*b.* 1860), a German who constructed a machine that actually transmitted images. Though wonderful, this invention was far from successful, and television had to wait until inventors could make the proper mechanical refinements. Charles F. Jenkins perfected a television device and in 1929 began broadcasting daily television programs. Although it is not yet a commercial success, the sponsors of this invention are hopeful that television will soon become an everyday experience.

Thomas Alva Edison. Thomas Alva Edison (1847–1931) was the world's greatest inventor. To chronicle his inventive exploits would fill many pages. As a young man, he became a telegraph operator, carrying on electrical and chemical experiments in his spare time. During these early years, he invented a repeater for taking down press messages. Edison's inventions, as a rule, grew out of a practical demand; he cared little for theoretical science. His renown rests in part upon his ability to bring to a happy conclusion investigations in which other inventors had failed and in part upon his own practical originality.

Edison's first important invention was the stock ticker used in brokerage offices, a machine so successful that few improvements have since been added. He was still but a youth and knew so little about the ways of the world that when given a check for $40,000 for this invention he thought it a worthless scrap of paper. In 1870, he improved the automatic transmitting devices employed by telegraph companies and soon devised a method of transmitting two or more messages simultaneously. He also perfected the transmitter, a device subsequently acquired by the American Bell Telephone Company. One invention followed another in quick succession. The phonograph, produced in 1878, astounded the public. Next the problem of a satisfactory electric light challenged

his attention. The chief difficulty was to find a durable filament, and Edison spent vast sums sending to all parts of the world in the search for a proper substance. Finally, he discovered that a certain variety of the bamboo plant was more successful than any one of the 6,000 other plants tested. The Edison incandescent lamp of 1879 was so serviceable that it was not improved upon until 1888, when tungsten replaced bamboo filaments.

The lighting problem now seemed at the point of solution, if only a suitable dynamo, or generator, could be produced. A number of important inventions had been made since Faraday's discovery of electromagnetic induction. Profiting from these, Edison soon doubled the efficiency of dynamos. He constructed a mammoth dynamo in 1882 that provided electrical current to light the streets of New York, and soon electric-light plants were operating in American and European cities.

The question next raised was whether electricity might not be harnessed to drive machinery and pull trains. Experimenting with an electric railroad as early as 1880, Edison produced a 15-horsepower electric locomotive that ran over a track of 3-foot gauge. Charles van Depoele (1846–1892), a Fleming who had settled in Detroit, added notable improvements. One of his ideas was to place a small wheel on the end of a trolley pole as the best means of picking up current from a distant generator. Soon the streets of many cities were provided with municipal streetcar systems that were an important factor in expanding urban centers. The underground systems of New York and large cities proved the value of electricity in providing inexpensive transportation.

Airplanes and Airships. Meanwhile, transportation by air became a reality. For centuries, man had dreamed of flying. Roger Bacon had some ideas about machines that would fly like birds, and Leonardo da Vinci made rough sketches of airships. By studying the action of flying birds, George Gayley, an eminent English inventor, learned that they keep themselves aloft by skillful gliding, steering, and balancing by their tails and wings. The most successful of many experiments, here and abroad, by would-be fliers was made by Samuel Langley (1834–1906), Secretary of the Smithsonian Institution. In 1896, he produced a model of a flying machine which at Quantico, Va., made a flight of 3,000 feet. Orville Wright (*b.* 1871) and his brother Wilbur (1867–1912) of Dayton, Ohio, produced the first successful flying machine, in 1908, that met all conditions demanded by United States Army authorities. Langley developed an improved model in 1914, which Glenn Curtiss flew over Lake Keuka in New York.

The First World War (1914–1918) witnessed great progress in aviation. Airplanes and airships proved invaluable for reconnaissance and combat. There was much experimentation, and better models were

constantly brought out. After the war, some officers of the United States Navy flew across the Atlantic Ocean from Newfoundland to England by way of the Azores and Portugal. Other flights followed in quick succession, the most romantic of which was the nonstop flight of Charles Lindbergh from New York to Paris in 1927. Such flights prepared the way for regular transoceanic flying schedules, which are now a commonplace. The great cities of the world are joined by a network of airways. Airplanes have become larger, safer, speedier, and more comfortable. The 314 clipper produced by the Boeing Aircraft Company is a flying marvel; it weighs 41 tons, carries seventy-four passengers, and is propelled by four 1,500-horsepower engines. This gigantic ship, with a wing span of more than 150 feet and a length of 109 feet, especially

FIG. 124.—Boeing Stratocruiser, 1950. (*Boeing Airplane Company, Seattle.*)

designed for transoceanic flying is probably but the forerunner of even greater air liners and fighting planes.

Some inventors believed that lighter-than-air ships would be more efficient than the heavy types just described, basing their conviction on the experience of balloonists. The difficulty is that balloons move with and not through the air. A dirigible balloon was not produced until 1884. Finally Ferdinand von Zeppelin (1838–1917), a German inventor, designed a dirigible airship with four propellers driven by a 4-horsepower engine. A large envelope filled with nitrogen gas lifted the ship to a height of over one thousand feet during the first flight. Such ships, popularly called "Zeppelins," were employed by the German army during the First World War. After the war a Zeppelin crossed the Atlantic, and regular sailings were established. The chief difficulty

with such dirigibles is that hydrogen gas, upon which they rely for buoyancy, is highly explosive. This danger was tragically illustrated in 1937, when the Zeppelin Hindenburg caught fire at Lakehurst, N.J. Helium gas, discovered in 1895, was found to be perfect for such ships, but unfortunately this nonexplosive gas is rare and expensive. Although helium would eliminate the hazard of fire, other factors such as manageability caused the heavier-than-air ship to supersede the dirigible.

Agricultural Implements. In the nineteenth century, there were changes in agricultural implements that in their significance in the social, economic, and political development of that century rank with the industrialization of industry. First in point time is the improvement of the plow. American Colonial farmers of the eighteenth century used a plow made of wood and provided with an iron moldboard. In 1797, Charles Newbold of New Jersey produced a plow of cast iron. But conservative farmers shook their heads. "Iron," they said, "poisons the soil!" Later, Jethro Wood (1774–1834) of New York took out a patent for an improved model of Newbold's plow. Gradually farmers were induced to use the new iron plows, and by the time of Wood's death immigrants were carrying the new plows into the virgin farm lands of the Ohio and the Great Lakes region. But the cast-iron plow was heavy, clumsy, and likely to break and scoured poorly. Ingenious blacksmiths working in the agricultural communities of Illinois produced many improvements. Among them was John Deere (1804–1886), who attached strips of circular saws to shares and moldboards. So successful was his venture that he opened the famous Deere factory at Moline, Ill., in 1847. Later James Oliver (1823–1908), an immigrant from Scotland, produced the Oliver chilled plow and opened his factory in South Bend, Ind.

Other inventors turned their ingenuity toward developing machinery to prepare the seedbed and to seed and plant the soil. The spring-tooth harrow, also an American invention, provided with flexible teeth, proved a useful tool in reducing the freshly cleared land to cultivation. New improvements appeared in Jethro Tull's grain drills, the most significant being a regulating device that dropped seed at an adjustable rate. Finally the Pennock brothers, Pennsylvania farmers, produced a model carrying a device whereby drills could be stopped or started while the machine continued to move. Later machines that seed clover and grass seed, distribute artificial fertilizers, and use disks that, running at an angle, neatly deposit seed and cover it with the requisite amount of earth are improvements upon the Pennock patents.

From time immemorial, farmers had cut grain with scythes. The first improvement in this method came when the cradle was invented; this was really a scythe with wooden fingers attached and so arranged as to gather grain in bunches. Next, mechanical reapers appeared.

Patrick Bell (1799–1869), a Scottish minister, invented a machine with moving blades that cut the standing grain held against the blades by a revolving frame adjustable to the height of the stalks. An endless canvas platform deposited the grain on the ground. From this point the development of the reaper was carried to a successful conclusion by American inventors. Obed Hussey (1792–1860) of Massachusetts invented a notched cutter bar that operated through slots in the tufting fingers. Cyrus H. McCormick (1809–1884), a Virginia farmer, made

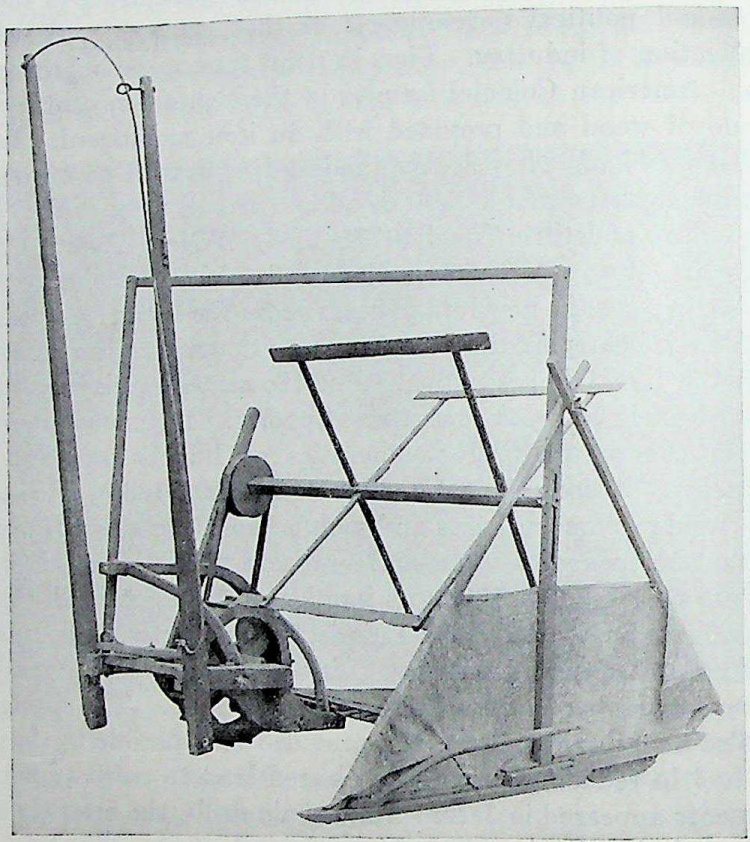


FIG. 125.—McCormick's reaper. (*Courtesy of the International Harvester Company.*)

further improvements in 1834. He produced the "reciprocating blade" and developed the armlike divider, which separated the grain, guiding what was to be cut away from what was left standing. The grain that fell upon a stationary platform was raked in bunches upon the ground. This reaper was an unqualified success; in one afternoon, it cut 6 acres of oats. But farmers were reluctant to use it because it threatened to take jobs from laborers. McCormick nevertheless persevered and sold fifty machines in 1844. He invented a device that raked the grain off the platform and deposited it in bunches to be tied by men following the

reaper. McCormick next moved to Chicago, a city rapidly forging to the front as the natural economic center of the Middle West and therefore the logical place in which to manufacture reapers.

As McCormick's reaper did not bind grain, inventors tried to produce a mechanical binder. The Marsh brothers of DeKalb, Ill., developed a moving platform that carried the grain over the driving wheel and dropped it into a bin. A man standing on a platform bound it into bundles. In 1858 a poor farm hand named John Appleby invented a mechanical knotter. He did not have the money to market this marvelous device, and when he fell into debt his invention was sold under the sheriff's hammer for only 17 cents. The friend who bought it presented him with it, however. After the Civil War, Appleby perfected his knotter and sold it to William Deering (1826–1913), whose Deering binders at once became famous. When its basic patents ran out, McCormick added the mechanical binder to his reaper.

The grain binder now was mechanically complete, one of the most extraordinary inventions of modern times. Inventors and manufacturers employed the principle of the grain binder in a variety of ways. The combine, invented for use in the vast level areas of the Sacramento Valley, harvested, threshed, and delivered grain in sacks. Headers cut the heads from stalks, threshed the grain, and delivered it in sacks. Like the combines, headers were drawn by teams of horses, later replaced by tractors. The corn harvester, invented in 1892, successfully adapted the grain binder to the harvesting of the corn produced in immense quantities in the Middle West.

The success of mechanical reapers raised the demand for mechanical threshing. Some Scots had produced devices that prepared the way for the traveling thresher, which was produced as early as 1836 in Kalamazoo, Mich. It separated grain from stalks and chaff by means of a swiftly rotating cylinder, screened and winnowed it, and fed it into bags. This notable invention was repeatedly improved upon, and wind stackers and self-feeders were added.

The invention of the reaper, grain binder, mower, corn harvester, hayraker, teddar, and other farm machinery demanded power to operate them. Portable steam engines appeared. By the addition of cogwheels, such engines supplied their own locomotion and soon were applied to all kinds of agricultural activity, especially plowing. Subsequently, the steam-driven engine gave way to the gasoline-propelled tractor, an adaptation of the principle of the automobile. Finally, caterpillar tractors generating up to 150 horsepower appeared.

Roller Milling. The phenomenal increase in the production of grain owing to mechanical methods of plowing, seeding, and harvesting and the opening of vast areas of fertile virgin soil to cultivation stimu-

lated improvements in milling. Until the nineteenth century, wheat was ground between millstones, a device widely used during the Middle Ages. A Swiss mechanic named Sulzberger invented grinding by rollers, a process later improved in Hungary. Next appeared the process of bolting, or sifting, and another for separating bran from middlings. Roller millings soon supplanted other methods, and mills were established at points conveniently near great wheat fields. Minneapolis speedily assumed world prominence as a milling center.

So vast is the history of inventions that a brief description of all the important devices developed during the nineteenth century would fill an entire book. Those mentioned show the close connection between mechanical progress and the life of the time. The one phenomenon that, next to the development of science, has most altered subsequent culture is the progress of inventions. These have created industrial and social problems which seem almost insoluble; to these we must now turn our attention.

FOR FURTHER READING

ANDRADE, E. N. DA C.: *Engines*
BARNES, H. E.: *An Economic History of the Western World*
BYRN, E. W.: *The Progress of Invention in the Nineteenth Century*
COLLINS, A. F.: *A Bird's-eye View of Invention*
———: *The New World of Science*
CRESSY, EDWARD: *Discoveries and Inventions of the Twentieth Century*
DOOLITTLE, W. H.: *Inventions of the Century*
DUNLAP, O. E.: *Marconi: The Man and His Wireless*
FORMAN, F. A.: *All about Inventions and Discoveries*
GIBSON, C. R.: *Great Inventions and How They Were Invented*
———: *The Romance of Scientific Discovery*
GLASCOCK, C. B.: *Gasoline Age*
GRAS, N. S. B.: *Industrial Evolution*
HAWKS, ELLISON: *The Book of Electrical Wonders*
———: *The Book of Remarkable Machinery*
———: *The Romance of the Merchant Ship*
———: *The Romance of the Transport*
HEATON, HERBERT: *Economic History of Europe*
HOLLAND, R. S.: *Historic Inventions*
HYLANDER, C. J.: *American Inventors*
———: *Cruisers of the Air*
KAEMPFFERT, W. A. (ed.): *A Popular History of American Invention*
LOW, A. M.: *Recent Inventions*
PEEL, C. S.: *A Hundred Wonderful Years: Social and Domestic Life of a Century*, 1820–1920
QUENNELL, MARJORIE, and C. H. B. QUENNELL: *A History of Everyday Things in England: The Rise of Industrialism* 1733–1851, *The Age of Production* 1851–1934
SMITH, J. R.: *Story of Iron and Steel*
THOMPSON, HOLLAND: *The Age of Invention*

Chapter XLV

STATE AND SOCIETY IN THE INDUSTRIAL AGE

During the past hundred and fifty years, the rate of progress in man's command over nature has been ten times as fast as in the period between Caesar and Napoleon, a hundred times as fast as in the slow prehistoric ages.—G. M. Trevelyan

TRANSFORMED by forces that became increasingly potent, the modern state during the decades following 1830 acquired some of its characteristic features as well as its stubborn problems. The French Revolution contributed the spirit of liberalism and its resultant democratic character of government. From the Industrial Revolution, especially after the first machines were perfected, came a rapidly growing mechanization of industry that radically transformed the social basis of the state and inevitably developed complicated bureaucratic institutions. The industrial and political structure was troubled by a serious perennial problem, that of the proper distribution of the fruits of labor. The unorganized workers, unable to protect themselves from exploitation and exposed to competition, demanded settlement of their grievances. So difficult is this problem that modern industrial society has never been able to discover a remedy. In the following pages, we shall discuss some of the more important movements that sprang from the difficulties in which the laboring classes were placed by the new industrialism.

Industrial Chemistry. Steam, electricity, and water provided power to drive the machines that made the factory system of the Industrial Revolution possible. During succeeding decades, however, industrial chemistry, a new agency borrowed from science, completely changed the aspect of industry. From the days of Liebig and Wöhler, industrial chemistry progressed rapidly until whole industries were based upon it. No one dreamed, for instance, what treasure was locked up in coal. Chemists and physicists had realized that a tremendous amount of energy was lost in unutilized smoke and gas but little suspected the variety of treasure hidden in that thick, black, oily, and disagreeable substance—coal tar. It was discovered that ten different "crudes" producing more than two hundred compounds such as benzene, phenol, and naphthalene might be distilled from it. The compounds derived from the crudes are of the greatest variety—dyes of many colors, perfumes, flavoring extracts, carbolic acid, explosives, bakelite, saccharin, salicylic acid used in aspirin, and collodion—to mention but a few.

After these crudes have been distilled, there remains a residue called pitch that also has a number of industrial uses.

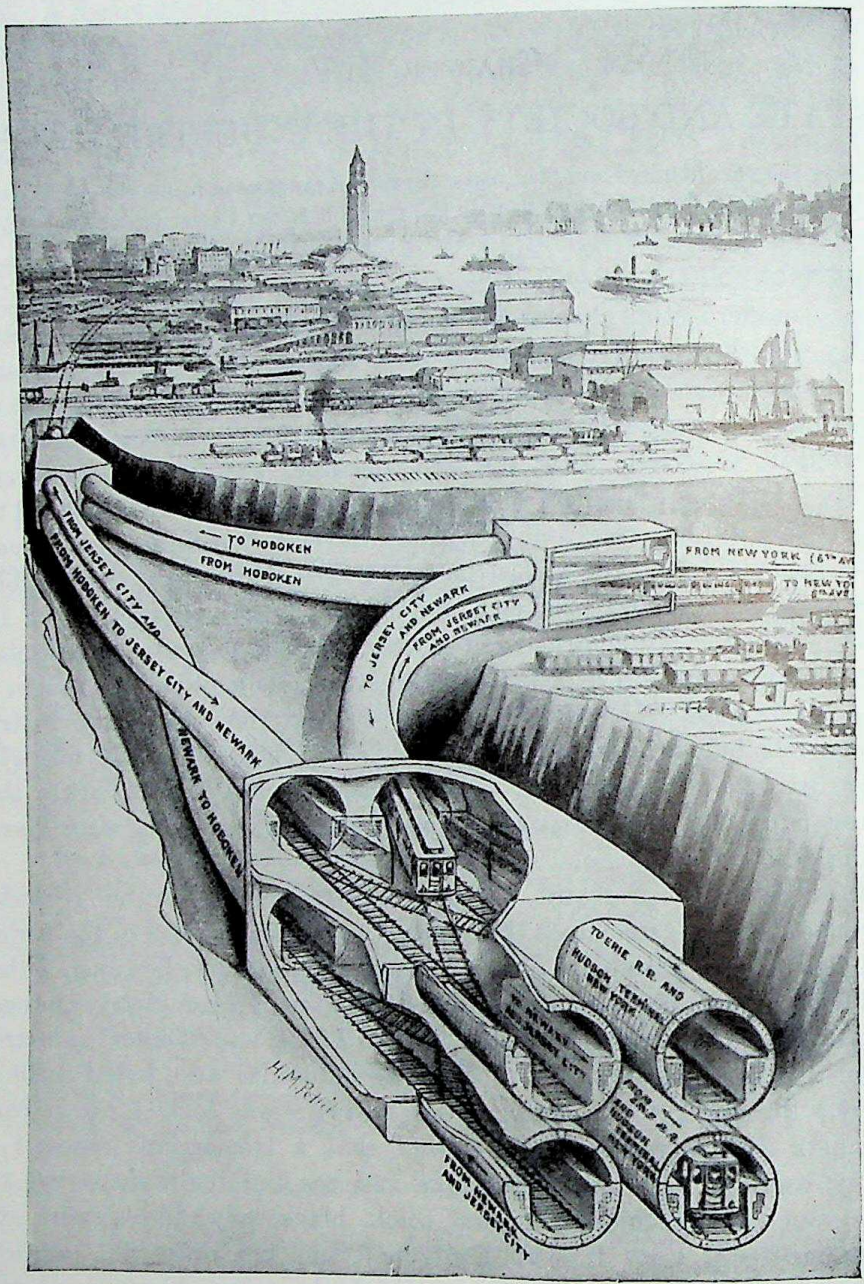


FIG. 126.—Maze of underground tubes, New Jersey. (*From Archibald Black, The Story of Tunnels.*)

Chemists found that other waste substances yielded valuable products. Casein, a material rich in carbon, hydrogen, oxygen, and nitrogen, is

obtained from whey and skim milk. This compound produces glue, paints, and a product called "karolith" from which buttons, combs, umbrella handles, buckles, beads, and similar objects are manufactured. From the immense quantities of oat hulls and corncobs cast away by mills a substance known as "furfural" was developed, a substance providing the base for dyes, solvents, disinfectants, and germicides. Cellulose, a constituent of wood, sawdust, and the waste of sugar cane, became indispensable in the manufacture of building materials, rayon, and artificial wool. Finally, chemists discovered how to collect nitrogen from the air, thus freeing industry from the monopoly of Chilean potash beds.

The industries thus developed upon the foundations of theoretical chemistry produced many products unknown a hundred years ago. Germany, in particular, made innumerable contributions to industrial as well as theoretical chemistry and thus won a leading position in the field of industry. Other countries followed her example, and chemical industries sprang up everywhere beside the older steel, textile, wood, and other industries. In this way the character of the Industrial Revolution begun in England during the eighteenth century was much amplified.

Mass Production and Mechanized Industry. Another feature that revolutionized industry was the "American system" of manufacture. The introduction of interchangeable parts marked an important stage in the development of quantity production. Eli Whitney, the inventor of the cotton gin, was the first industrialist to utilize this method when in 1798 he received an order from the United States government for 15,000 muskets. Instead of beginning the production of muskets at once, he built machines with which to manufacture interchangeable parts for a standardized musket that could be readily repaired simply by changing its broken parts. Hitherto, each musket, and other industrial objects as well, had been built as a complete unit. Whitney's method made it possible to manufacture articles on the basis of quantity production.

A second American innovation in manufacturing is mechanized industry. This consists, not only in the manufacture of interchangeable parts, but in assembling them as much as possible by machine methods. The first industrialists to develop mechanized manufacture were the beef-packing operators of Chicago. Mechanical methods of slaying, scalding, scooping, dressing and cutting up hogs became highly perfected. Every unnecessary operation was eliminated so far as possible, to reduce costs and increase output.

Mechanized industrial manufacture—the production of the largest quantity of goods of a given quality at the lowest cost—gained its greatest practical success in the newly created automobile industry. Henry Ford, who founded the Ford Motor Company of Detroit in 1903, was a

leader in perfecting mass production by means of the "assembly line." Overhead trolley carriers brought the work to the workers, who no longer exhausted their energy in lifting heavy weights. Further, every part of the automobile was rigidly simplified, and its interchangeable parts were standardized. All handwork that could possibly be done by machines was mechanized to eliminate expense. The workman also was standardized. Taught to perform certain actions accurately and at a given rate of speed, he took his stand by the moving assembly line; the work came to him at a steady rate, and as it passed he performed his specified task quickly and well. The moving assembly line carrying the simplified and standardized parts and managed by workmen carefully trained for accuracy, thoroughness, and speed is the essence of mass production. These methods resulted in the manufacture of an unprecedented number of cheap automobiles. By 1921, more than five million "Fords" alone had been manufactured. The price of the Ford touring car declined from $950 in 1909 to $360 in 1916. It was no idle boast that "Ford had put the country on wheels."

ENGINEERING. Progress in the mechanization of industry, commerce, transportation, and every aspect of modern life has necessitated the employment of highly skilled technicians. The modern city, for example, with hundreds of thousands and even millions of inhabitants cannot possibly exist without a large staff of engineers. Elaborate networks of water and sewage mains, sedimentation tanks, and sewage-reduction plants have been required because of the growth of population and the development of preventive medicine, bacteriological science, and sanitary engineering. The necessity of providing the populace with wholesome water has forced city governments to construct extensive systems of mains, reservoirs, and aqueducts that in many cases transport water hundreds of miles. Electric light and power, natural or artificial gas, and extensive heating systems have been installed, each of which constitutes an industry in itself. Problems of transit have so multiplied with the use of the automobile and the growth of population that the skill and ingenuity of engineers have been taxed to provide cheap and rapid transportation. Elevated railroads, subways, tunnels, and bridges have brought cities or parts of cities closer together. The modern office building, characteristic product of the great city, is a genuine triumph of engineering skill. One of the large office buildings in New York, for example, has thirty-five stories, contains 560,000 square feet of floor space, and houses the offices of a large number of firms. As many as 5,000 people work in these offices, enough to populate a small town. Buildings of this sort are scientifically provided with steam heat, water, sprinkler devices, electricity, gas, telephones, elevators, lavatories, and restaurants.

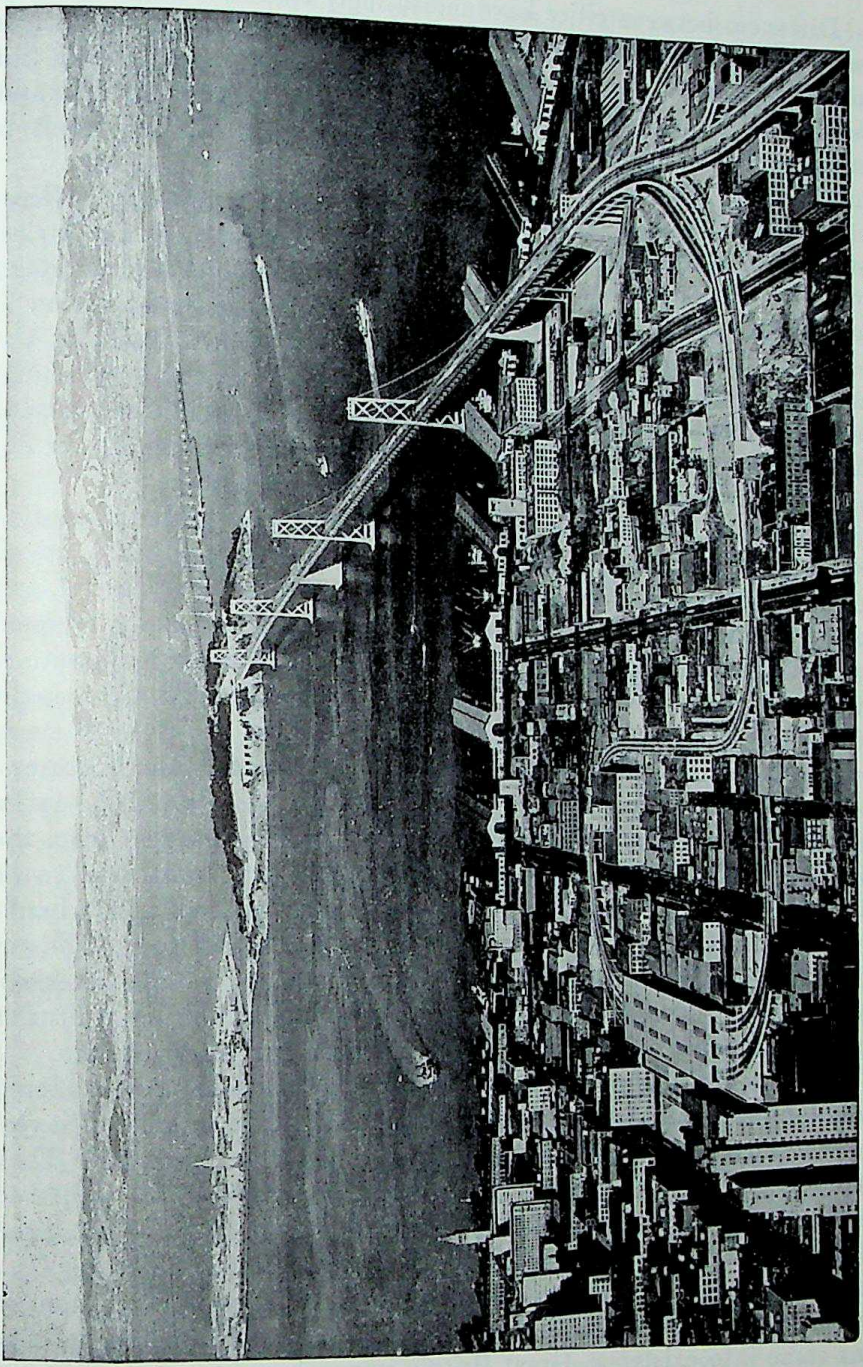


FIG. 127.—San Francisco-Oakland bridge. (*From Archibald Black, The Story of Bridges.*)

Distances between cities have increasingly contracted through engineering methods. Today, great highways and viaducts of concrete span the country; networks of railroads connect city with city; canals link ports to waterways; airways, railroads, and bus lines ensure the rapid transportation of persons and foodstuffs—all these are the result of modern engineering skill.

Transmission lines form immense public-utility networks. Great dams retain enormous quantities of water for the generation of electrical power and for irrigation. Among the more notable American dams recently constructed or in process of construction are the Boulder Dam on the Colorado River, Roosevelt Dam in Arizona, Wilson Dam in Alabama, Bonneville on the Columbia River, and Grand Coulee in Washington. Representative of another significant type of hydraulic engineering is the elaborate system of dikes and dams whereby part of the Zuider Zee in the Netherlands has been reclaimed for agricultural use.

Financial Organization. The new types of industrial organization responsible for the changes discussed above profoundly modified political, social, and economic life. Handicrafts and homework disappeared, and factory production took their place. It was impossible for any one man to provide enough capital to organize an industry and keep it in operation. There were many reasons for this. The manufacturer usually bought needed raw materials for cash; paid his workmen at the close of every week; and sold his products in competition with other manufacturers. In other words, he was forced to pay for the raw materials and the entire cost of manufacture and distribution before collecting one cent from the sale of his goods. Wholesale prices fluctuated, great risks had to be taken, and manufacturers frequently were brought to the brink of bankruptcy. In such circumstances it was imperative to devise methods of raising sufficient capital to purchase new machinery, secure raw materials, pay wages, and meet incidental bills. The traditional one-man firm or simple partnership could not solve such intricate business problems.

The joint-stock company, developed during the Middle Ages, offered a solution. A joint-stock company was composed of a number of investors who advanced the necessary capital to carry on business. They usually issued dividend-paying shares, which were sold to the public to provide further needed capital. Such corporations in England possessed limited liability, as the word "limited" in their official titles implied. Similar privileges were granted to companies formed on the continent of Europe and in the United States. A great number of limited-liability firms came into existence, Great Britain possessing as many as 105,000 in 1930.

Since the beginning of the Industrial Revolution, banks, too, had proved indispensable. Institutions were needed to keep money on

deposit, make loans, transfer credit through drafts and checks, and issue promissory paper. The earliest banks of the Industrial Revolution were owned by individuals, but joint-stock banks were organized in Great Britain as early as 1826. At first there were many abuses, causing customers vast losses, especially in connection with banks of issue, that is, banks that issued promissory paper. Governments were soon forced to regulate banking rigidly. Sometimes banks were forbidden to issue paper, as in Great Britain, which prohibited any bank founded after 1844 from issuing promissory paper.

The phenomenal development of governmental activity also required great sums to finance public undertakings. States borrowed heavily, especially in time of war. The rapid expansion of industry and world trade after 1850 required ever larger sums of money. The First World War (1914–1918) and the rehabilitation that followed it demanded an unprecedented amount of capital. National debts rose to fantastic levels. International loans of unprecedented size were made. Banking became a commercialized business without which state and industry could hardly function. This new type of banking, particularly as it evolved after 1900, may be called finance capitalism.

Panics and depressions accompanied by bank and business failures, alternating with periods of industrial and commercial prosperity, have been a fixed feature of economic conditions since the beginning of the Industrial Revolution. Such business fluctuations have exerted a profound influence upon political and social history. The historian can show a relationship between periods of depression and war, revolution, immigration, crime, and invention. Some depressions have had only a national effect, while others have exercised a world-wide influence. From the inception of the Industrial Revolution, business declines occurred in 1763, 1773, 1783, 1793, 1815, 1825, 1836, 1847, 1857, 1866, 1873, 1882, 1893, 1907, 1920, and 1929. The average worker was fortunate if he could repair the ravages caused during a depression by the opportunities provided by the succeeding economic boom. In general, recurrent hard times have multiplied the difficulties of state and society and have often paralyzed sound plans for national and international improvement.

To eliminate competition, assure a ready supply of basic raw materials, guarantee profits, and avoid depressions, businessmen formed combinations. In some cases, they sought to own or control all businesses that contributed something to their activities. A typical example is furnished by Hugo Stinnes, a German industrialist who began operations as a coaldealer in 1892 and at his death in 1924 owned or controlled mines, coke ovens, blast furnaces, steel plants, shipping facilities, lumber companies, newspapers, hotels, shoe factories, insurance companies, and oil fields. Such combinations are called trusts. A cartel is a special

form of trust in which a group of independent businesses have united in order to promote their interests, agreeing to observe certain rules for a stated period. In recent years a number of large international cartels have sprung up, especially in Germany. A good example is the soap and margarine combine formed in 1929 by the union of Lever Brothers, an extensive British organization, and two large Dutch concerns. This group, known by the name Unilever, produces margarine, soap, perfumes, and cattle foods and operates restaurants, fish shops, and chains of grocery stores.

Financial combines also were a feature of nineteenth-century economic life. Banking concerns expanded their operations as lenders. Securing control of businesses, they frequently were able to dictate to boards of directors by means of interlocking directorates. So constant was the need for capital by business firms that directors of banking companies frequently were given seats on commercial and industrial boards of directors. J. P. Morgan and Company of New York, for example, in 1920 controlled at least fourteen great business institutions.

One serious consequence of this development of industrial and financial institutions is that the control of many firms was divorced from ownership. Having no effective control even though it owns a majority of the stock, the uninformed public tends to become indifferent to management. Sometimes it is fleeced by unscrupulous financial wizards who take advantage of the complicated structure of modern business to collect money from a public that believes it is making sound investments. Consequently, the modern "holding company" has gained an unsavory reputation. Such a company secures control over several individual organizations usually in the same line of business. A remarkable international holding company was formed by Ivar Kreuger, who controlled the production of more than 80 per cent of the world's matches. The management for some time enjoyed a reputation for honesty, but Kreuger's reckless policy of raising money and his speculative methods brought ruin to countless investors during the hard times that began in 1929.

Processing and Advertising. Methods of selling, especially in the retail business, changed greatly during the closing decades of the nineteenth century. Formerly, grocers and other dealers bought goods in bulk and sold them in small quantities. "Packaging" revolutionized such businesses. Wholesale firms put their products up in attractive and sanitary paper boxes or tin cans and gave their products special names registered with the government to prevent competitors from using them. They advertised their goods in newspapers and magazines and on billboards. It was discovered that customers were willing to pay more for goods put up in attractive packages and that frequently they accepted the manufacturer's word that his product was superior to his

rivals'. Such is the power of advertising that firms now must resort to it in order to dispose of their products. Trade names like "vaseline," "kodak," and "frigidaire" have practically supplanted the common terms petroleum jelly, camera, and electric refrigerator. Firms that process foods and put them up in containers today rank among the big businesses of the world.

Growth of Population and Trade. The colossal expansion of industry gave opportunity for work to many men and women. From the beginning of the Industrial Revolution the population had grown rapidly, but huge increases came after the middle of the nineteenth century. The population of agricultural countries also tended to grow owing to the general prosperity. The following table illustrates the phenomenal increase of population since 1800:

Country	1800	1900	1930
Great Britain	16,200,000	41,600,000	46,189,000
Germany	21,000,000	56,800,000	65,300,000
Italy	18,100,000	32,400,000	41,928,000
Austria-Hungary	23,100,000	45,400,000	
Russia (in Europe)	38,800,000	113,300,000	165,000,000
United States	5,300,000	76,100,000	122,000,000

Never before in all history have such numbers been largely supported by the profits of industrial activity. A great proportion of the inhabitants of western Europe are dependent upon the constant importation of raw materials from lands like South America, South Africa, and the East Indies and rely upon the export of manufactured goods to such industrially backward regions for their profits. This situation has led to a degree of commercial, industrial, and financial interdependence never seen before. Germany, for example, must import most raw materials except coal and iron to keep its industries going—a matter of life or death, for without the steady export of industrial goods its population is deprived of vital necessities. This dependence upon foreign supplies of raw materials and markets has resulted in keen competition among nations.

As a result of industrialization and the phenomenal increase in population, international trade speedily rose to unprecedented proportions. During the nineteenth century, while the population of Europe more than doubled, its foreign trade increased twentyfold. An active commerce sprang up with tropical or semitropical countries, and cocoa, coffee, tea, cane sugar, spices, bananas, copra, silk, jute, palm oil, and rubber were brought to Europe in large quantities. Another type of trade was with distant and for the most part nontropical forest, mineral, agricultural, and industrial regions. A vast amount of cot-

ton, wool, lumber, pitch, iron, copper, tin, grain, fruit, livestock, and hides, which local European production could not possibly supply, was needed. A third type of commerce in manufactured articles developed among the industrial countries of western Europe. Some regions enjoyed a reputation for certain specialties not equaled elsewhere. Thus, the Netherlands exported dredging machines; Germany, toys, microscopes, and cameras; Switzerland, watches; France, soaps, perfumes, and articles of luxury; England, woolens and machinery.

Typical of the new kind of commerce is the trade in meats. Preserving meat had become an important industry by 1870 and proved a boon to workingmen and their families in the cities of Europe. A century ago, vast numbers of sheep were raised in Australia, but only their fleeces and tallow were shipped to England. Their carcasses were destroyed as waste, for there was no way of preserving meat. The first frozen meat was shipped from Australia to London in 1880. Gradually the practice of freezing meats was supplanted by chilling meats. The cattlemen of Argentina also began to export meats to Europe. Some idea of the magnitude of this kind of commerce may be obtained from the fact that in 1923 New Zealand alone exported 6,400,000 carcasses of mutton to England.

A characteristic method of guaranteeing markets in this competitive age was by means of tariffs. Manufacturers induced their governments to charge a sufficient percentage upon goods imported from abroad to cause people at home to prefer the products of their own factories. The arguments of "protectionists" have always proved attractive to American manufacturers who wished to ensure for themselves the market of the United States. In other countries, notably England, free trade long proved more practicable. This was because English manufacturers felt that, such was their industrial leadership, they could outsell competitors. Further, it kept down living costs for workers and made manufacturing cheaper. Tariffs naturally resulted in international trade rivalries and so came to form part and parcel of national economic and political policy.

Rise of Socialism. These industrial and commercial changes described above had far-reaching effects in nineteenth-century life and thought. The factory system produced an industrial laboring class whose chief economic stake in the social and economic order consisted in a chance to sell the labor of their hands. Bankruptcy and financial depressions were disastrous for them, and competition among the workers kept wages down to the minimum. Owners of factories, on the other hand, were more able to withstand the periods of business adversity. There was a glaring contrast between entrepreneur and factory worker, whose position after 1830 increasingly demanded attention. Indus-

trialists believed that as they created and organized businesses, provided capital, and assumed risks they should be abundantly compensated. They bought the labor of workers for as little as possible and caused men, women, and children of five and ten years to work as many hours per day as possible. One of the worst examples of industrial exploitation was among the silk workers of Lyons in 1830. For a day of 18 hours the worker received 18 sous, which in American money was only 4 cents! Such injustice was an affront to every principle of humanity; it became a festering sore in European industrial life, one of the greatest of social problems.

During the years following 1840, Europe passed through a trying period. The potato famine, due to a fungus disease that attacked potato vines while the tubers were forming, proved an international disaster. For several generations the potato had been a chief article of food for the lower classes, its cheapness making the struggle for existence a little easier. The resultant increase in population furnished cheap labor, which was absorbed by the rapidly expanding factory system. The almost complete failure of the potato crop in 1845, 1846, and 1847 produced a serious crisis in France, Belgium, the Netherlands, Germany, and particularly Ireland. In the latter three countries, it led to a sudden emigration to the woods and prairies of the United States.

Grave as were the consequences of the potato famine, the depression of 1847 rendered the political and social crisis even more acute. The *bourgeoisie* continued to nurse grievances after the French Revolution of 1830. They insisted on more liberal constitutions, wider suffrage, parliamentary control, greater freedom of the press, and broader educational privileges. The bourgeois revolutionary movement, thus clearly developed, combined with an even more revolutionary force, the discontented working classes. The Revolution of 1848 therefore was proletarian as well as bourgeois. It started in Paris in the month of February, hence the common designation "February revolutions," and spread over the Continent. The power of the movement forced many concessions to liberal demands and in some countries evoked new constitutions. But the basic social problem was not settled; it has continued to trouble society until the present moment.

The philosophy of socialism was a characteristic product of such conditions. In general, the advocates of socialism were moved by the humanitarian sentiments that, as has been pointed out, were a marked feature of the Age of Reason. Most of them wished to improve conditions through moderate measures. Only when opposition seemed to make reform impossible did socialism become revolutionary in tone. The word "socialism" was first used, it appears, by Robert Owen (1771–1858), who operated a cotton mill in Manchester, England. He

made a comfortable fortune but was depressed by conditions in the factories. The monotony of mechanical labor stunted the mental growth of men, women, and children who worked long hours for a mere pittance. Opportunity for education was lacking. Houses were unsanitary, vice and drunkenness common. Owen set up a model industrial community at New Lanark, Scotland, under ideal working conditions and with comfortable homes. Educational facilities were provided. A cooperative store, sick benefits, and old-age pensions were established. Although Owen's scheme was practical, industrialists were too closely wedded to their individualistic ideas to follow his example. Finally, embittered by their opposition, Owen went to the United States, where he set up a utopian community in New Harmony, Ind., which soon failed. On his return to England, Owen continued his agitation for reform.

The Frenchmen Henri de Saint-Simon (1760–1825) and Charles Fourier (1772–1837) advanced even more idealistic and impractical schemes. The former believed that the future state should be an industrial society without hereditary noble and military classes. The intellectual elite of the country alone possessed the scientific knowledge and humanitarian sympathy to direct industrial society. Only they would know how to produce a happy community in which each member would find a useful place. Individualism and competition would be eliminated; all strife, including wars, would come to an end. Saint-Simon's scheme could not succeed. Its fault was the belief that a theoretically perfect society would produce perfect human beings. The ideas of Charles Fourier were even less practical. He believed society should be divided into industrial units called *phalansteries*, of about fifteen hundred persons each. These were to hold land, buildings, and machinery in common and share the products of their labor. Fourier believed that if each individual fully realized his social and economic needs he would be happy and peaceful. He would do what he liked; soon all social ills would disappear. One such *phalanstery* called Brook Farm was founded near Boston, Mass.; it did not succeed but broke on the rocks of innate human selfishness.

Louis Blanc (1811–1882), a French statesman, adopted the ideas of Saint-Simon. But he was far more than an idealistic dreamer. A capable agitator, he filled his writings with sweeping denunciation of the evils attending the Industrial Revolution. France, he declared, was controlled by a well-to-do, corrupt, and tyrannical *bourgeoisie*, constituting a government of the rich, by the rich, and for the rich. Consequently, the people should abolish it and create a democratic socialistic state in its place. Such a state once established, workshops were to be organized, provided with the necessary capital by the state.

Workmen were to manage the factories democratically and share in the profits. Such factories would supplant establishments created and financed by private enterprise so that finally a completely socialist regime would be attained. All this, he believed, was involved in the slogan of the French Revolution—liberty, equality, fraternity.

KARL MARX AND FRIEDRICH ENGELS. More enduring, because more basically revolutionary, than the panaceas of Owen, Saint-Simon, and Fourier described above were the ideas of Karl Marx (1818–1883), a German Jew whose family had embraced Christianity. Marx was profoundly influenced by the philosophical ideas of Hegel; his writings cannot be adequately criticized without considering Hegel's place in the development of nineteenth-century thought. Expelled from Paris because of his views, Marx went to Brussels, where he lived during the exciting year of 1848. With the assistance of his friend Friedrich Engels (1820–1895), he produced the famous *Communist Manifesto.* Marx wrote other significant works, the most important being *Capital.* This serious work on economics provides the philosophical basis for revolutionary socialism.

Marx's main teachings may be divided into three parts. First and most fundamental is the materialistic interpretation of history. All political and social organization, law, religion, art, philosophy, literature, science, and morality are products of the economic regime in which they exist. This basic principle is stated clearly and simply as follows:

> The mode of production must not be considered merely from the aspect that it is the reproduction of the physical existence of individuals. It is rather, in fact, a definite form of activity of these individuals, a definite form of expressing their life, their definite *mode of life.* As individuals express their life, so they are. What they are therefore coincides with their production—*what* they produce as well as *how* they produce. What individuals are therefore depends on the material conditions of their production.

The following quotation is a more elaborate statement of the same idea:

> Even the phantasmagoria in men's brains are necessary supplements of their material life-process, empirically demonstrable and bound up with material premises. Morals, religion, metaphysics, and all other ideology and the corresponding forms of consciousness thus no longer maintain the appearance of independence. They have no history, they have no development; but men, developing their material intercourse, change, along with this, their real existence, also their thinking and the products of their thought. It is not consciousness that determines life, but life that determines consciousness.[1]

[1] *A Handbook of Marxism,* pp. 211, 212–213, International Publishers Co., Inc., New York.

The second point in Marx's teaching is that concentration of capital in the hands of entrepreneurs—so prominent a feature of the Industrial Revolution—would increase disproportionately. Great trusts would come into existence; business would be concentrated in ever fewer hands. Finally, there would be only a few capitalists and a few large monopolies; most of the people would be laborers. A few would have all the wealth; the mass would be poor and miserable.

"The history of all hitherto existing society is the history of class struggle." This is the third point in Marx's teaching. He believed that an irreconcilable antagonism existed between capitalist entrepreneurs and their exploited workers. Therefore the latter should organize throughout the world, overthrow their oppressors, and socialize land, money, and industrial equipment. A democratically controlled society, including industrial organization, would be the result. Then there would be no exploitation, and all men would be free and equal.

As a classic expression of the problems confronting workers in 1848, the *Communist Manifesto* advocates the violent overthrow of what it called the "bourgeois control of society." The following quotation from the introduction written by Friedrich Engels was a call to action:

> . . . In every historical epoch, the prevailing mode of economic production and exchange, and the social organization necessarily following from it, form the basis upon which is built up, and from which alone can be explained, the political and intellectual history of that epoch; . . . consequently the whole history of mankind . . . has been a history of class struggles, contests between exploiting and exploited, ruling and oppressed classes; . . . the history of these class struggles forms a series of evolutions in which, nowadays, a stage has been reached where the exploited and oppressed class—the proletariat—cannot attain its emancipation from the sway of the exploiting and ruling class—the *bourgeoisie*—without at the same time, and once and for all, emancipating society at large from all exploitation, oppression, class distinctions, and class struggles.[1]

Such are a few of the central ideas of Marx's *Communist Manifesto* and *Capital*. His extreme doctrine of historical materialism is difficult to maintain in the face of calm analysis, but this did not deter his followers from adopting his views as the basis for international party action. The great response to Marx's works was due to the shameful industrial exploitation to which large numbers of human beings seemed condemned. Without hope of decent living conditions, proper food, adequate education, and a sufficient wage, many workingmen accepted his revolutionary doctrines. Rousseau had envisioned a society in which all men were free and equal, and liberals believed in these ideals. In practice, however, freedom had degenerated all too often into exploitation. The

[1] *Manifesto of the Communist Party by Karl Marx and Friedrich Engels*, p. 6, International Publishers Co., Inc., New York.

followers of Marx also believed in Rousseau's freedom and equality but hoped to accomplish his end by socializing property.

LABOR-UNION MOVEMENT. Confronted with the fact of insufficient wages and the danger of being deprived of a livelihood, factory workers organized labor unions. The movement was most prominent in highly industrialized countries like England. At first there was much opposition to labor unions; employers, who were powerful politically and able to influence governments, checked their growth. But after 1850 unions began to flourish. In England, the Amalgamated Society of Engineers, composed of engineers, machinists, blacksmiths, and metalworkers, proved most successful in guarding the interests of its members. This organization conducted itself soberly and wisely so that public authorities and industrialists showed little opposition to it. Laborers of other trades copied its organization, which ultimately became known as the "New Model." The labor-union movement in the United States developed more slowly because the country's industrial progress about 1850 lagged behind that of England. One of the first unions was that of the locomotive engineers, formed in 1863. Other workers soon followed their example. Finally, a national organization was formed known as the Knights of Labor, which in 1886 had 720,000 members. The American Federation of Labor, which supplanted it in 1881, endeavored to unite all trade and labor unions in the United States and Canada.

Unions sought to gain their objectives through collective bargaining rather than revolution. Only by this method, it was thought, could workers maintain fair wages and eliminate competition that threatened to lower wages below a subsistence level. The theory of union leaders regarding compensation is that men should earn wages which "will enable the worker and his family to live in health and comfort, provide a competence for illness and old age, and afford to all an opportunity of cultivating the best that is in mankind." To attain these objectives, unions endeavored to establish "closed" shops, in which only union labor is hired. Often they failed to force employers to grant this point and had to be content with the compromise "open shop," in which nonunion as well as union members are employed.

The labor movement was an immense benefit to the working class. It educated workers in cooperation and the assuming of responsibilities. The labor movement also stimulated social legislation, especially after labor parties were formed. Factory legislation was enacted, limiting hours of labor, decreeing compulsory holidays, protecting minors and women, and providing workingman's compensation, old-age pensions, and medical and hospital benefits. Every industrial country in Europe and the Americas, whether large or small, was enacting such legislation before the First World War (1914–1918).

Extension of the Suffrage and the Secret Ballot. Hoping to compel the state to create legislation favorable to labor, workingmen demanded the extension of the ballot to the lower classes. After 1840, they insisted upon the right to vote in every industrial country of western Europe. The English Reform Act of 1832 had put the direction of the government into the hands of the middle classes—merchants and industrialists. Next, the unenfranchised workingmen of England who found it hard to make a living after the depression of 1847 engaged in the Chartist movement, which was to win the ballot for all. The Reform Act of 1867 extended the ballot to householders in boroughs and to large groups of country dwellers, and the Reform Act of 1884 gave the ballot to the humbler classes on exactly the same terms as to householders in boroughs. By these measures, England became virtually a democratic nation. In the United States, where democratic equality had long been a reality, the ballot was a popular institution. Other European states like Belgium, the Netherlands, France, and Switzerland also granted workingmen the right to vote. This very general extension of suffrage naturally increased legislation in favor of laboring men.

The secret ballot, first employed in Australia, also was a boon to the working classes. Open voting, long the rule in England, made it possible for employers to influence the workingman's vote; thus, voting was a dangerous privilege. The secret ballot was introduced into the United States at an early date. England adopted it in 1872, and other countries with representative government quickly followed their example.

The First and Second Internationals. Many laboring men were not in sympathy with the deliberate actions of unions and believed that workers should form a political party strong enough to force laws favorable to labor. The doctrines of socialism as taught by Karl Marx appealed to the more radical and impatient. Believing in the economic interpretation of history and the theory of class struggle, they were convinced that net profits—the share that employers received under the capitalistic system as distinct from wages and rent—belonged entirely to the working classes. The *Communist Manifesto* of Karl Marx became their political Bible.

In 1864 the more determined of these men formed an association in London known as the First International. Radicals of all nations took part in its activities, denouncing the "basis of every kind of servitude, of social misery, of spiritual degeneration, and of political dependence." But the individualistic and impractical members could not agree among themselves and fought so bitterly that the association disbanded in 1873. The Second International, composed of political Socialist parties, was organized in Paris in 1889. Not run by individualistic radicals, it rejected the doctrine of a universal proletarian uprising and declared

that control by the laboring classes over industrial processes "must be the result of long and assiduous labor of proletarian organization in both political and economic fields and of the gradual conquest of municipal and legislative assemblies."

Socialists, therefore, proposed to work like the great political parties, their actions to be tempered by political expediency. Exerting immense influence on social legislation, they conducted relentless propaganda against war. But when the First World War broke out in 1914, the Socialists, who had long insisted upon the international solidarity of the laboring man, became patriots and labored for the victory of the countries of which they were citizens. Although possessing a membership of over twelve million, they failed to prevent the war or even to influence it; and, in the anxiety and excitement that followed, the Second International foundered. But the influence of Marx's socialism lived on to play an important part in the troubled years after 1917.

Further Developments from Socialism. Other types of socialism sprang into existence. Christian Socialism appeared in England under the leadership of the novelist and reformer Charles Kingsley (1819–1875). Christian Socialists rejected the basic materialist philosophy of Karl Marx, substituting for it the gospel of love, as taught by Jesus, under which poverty would decline and social evils vanish. Strenuously opposed to the "enlightened selfishness" of the conservative economists of the day, they sought to ameliorate the lot of laboring men by establishing labor unions, workingmen's institutes, and social settlements. Their practical program is presented in Kingsley's *Alton Locke*, a novel describing the wretched condition of London tailors. Although not immediately successful, the Christian Socialists prepared the way for social reform, which became a prominent feature of English politics by 1900.

Another form of socialism very different from the Marxist socialism of 1870 and 1880 is the one loosely described as "state socialism." Disapproving of the conflict between capital and labor, state socialists believed the state should establish peace by regulating both. Capital was to be checked by controlling prices, rates, and investments, while labor was to be safeguarded by controlling wages, hours of labor, and factory conditions. The state socialists were able, among other measures, to secure the 8-hour day, the minimum wage, and the curtailment of child labor. Germany inaugurated a system of social insurance that was copied by other governments. State socialism gained in many countries, partly because of the demands of workingmen for legislation to better their condition and partly because capitalists and others, fearing the consequences of radical labor movements, hoped to kill socialism by legislative kindness. Such unrevolutionary socialism in the end proved antagonistic to socialistic movements.

The encyclical *Rerum novarum* issued by Pope Leo XIII in 1891 is especially worthy of study. It is a sane statement of the relations of labor and capital. Starting from the Christian principles of justice and charity, the Pope held that laboring men should be honest, just, and peaceable. Private property, he declared, is indispensable to the liberty and dignity of Christian men. Employers should respect the religious rights, family interests, morality, and physical strength of workers and should pay them just wages. The church should teach the principles of justice and right moral relations; the state should promote the welfare of workers and aid the poor, protect all classes, and maintain order. Employers and employed, together or separately, should form associations to promote their interests; and such groups might discuss labor conditions, insurance, and other matters. Although these pacific counsels were usually disregarded, they nevertheless exerted much influence.

The Fabian Society, appearing in England in 1884, was composed of young "intellectual" radicals frankly socialist in their attitude toward the labor problem. Among its members were Beatrice and Sidney Webb, H. G. Wells, and George Bernard Shaw. They believed that the principles of socialism formed the proper basis for social action but refused to form a Socialist party. They preferred a "Fabian policy"—to avoid decisive contests and promote their cause by urging their views upon all parties and groups. These clever writers attracted much attention and contributed to the final overthrow of laissez-faire ideals in the economic and political life of Great Britain.

Guild socialism, a mild form of syndicalism (see below), appeared in England about 1910. Its leaders believed that industries should be controlled by workingmen's unions or guilds and not by the state. There were to be similar associations of consumers. The government was to act as arbiter, thus preserving a healthy balance in economic life.

Anarchism. Not all the discontented joined the socialist ranks. There were some who followed Rousseau's romantic ideas on freedom. Their leader was Mikhail Bakunin (1814–1876), a Russian aristocrat who passionately espoused the liberal philosophies of his day and adopted extreme revolutionary ideas. He believed that to be free man should uproot the state, family, and religion; terrorism was to be adopted as a consistent policy. Bakunin traveled far and wide over Europe, wherever discontent or revolution offered opportunity for anarchist propaganda. As taught by Bakunin, anarchism aimed to create freedom for man by destroying the ideas and institutions that condition his activity. This extremely individualistic doctrine seems impossible to carry out in practice. The institutions of home and state are basic factors in the development of civilization; to destroy them is to create chaos. To uproot religion is to do away with an activity that in all ages has given

purpose to life, invested it with a peculiar moral temper, and provided the basis for constructive thought and action. If socialism seems to place too much responsibility upon the organism of the state, anarchism naïvely assumes that man can do better without institutions.

Anarchists were too individualistic to agree upon either doctrine or action. The Frenchman Pierre Joseph Proudhon (1809–1865) argued that a communist system of society should be created after the private ownership of property had been destroyed. Max Stirner (1806–1856), German author of *The Ego and His Own*, passionately denounced moral and social bonds and all institutions that prevent the individual from expressing himself completely. Anarchists thus failed to agree on even the most essential fundamentals and so exerted only a restricted influence. Many were poetic dreamers and humanitarians who opposed the church, religion, child labor, capital punishment, vivisection, the slaughter of cattle for food, and war. They were more or less harmless, but some carried their ideas into practice, resorting to assassination as in the case of the Anarchist who in 1901 shot President McKinley.

Radical workingmen were not attracted by the extreme doctrines of anarchism even though disappointed by the restraint observable in socialist quarters and the inevitable slowness of reform. Socialist parties played politics like the more conservative parties; and the interests of workingmen appeared lost in the bogs of parliamentary government. Confronted with the practical realities of politics and national economy, socialist leaders tended to become cautious. Consequently, a radical movement called syndicalism appeared in France, Italy, and other countries before 1900. Syndicalists believed that workingmen should take no part in politics but devote themselves to preparing the proletariat for the general strike through which they hoped to gain their ends. The movement embraced both skilled and unskilled workers. "Direct action" was to be the constructive policy of the proletariat, with sabotage as a chief weapon. The philosophy of syndicalism was expounded by Georges Sorel (1847–1922), a French engineer, whose *Reflections on Violence* stresses Marx's ideas regarding class war, the debasement of the proletariat, and the need for revolution.

Markedly different from the extreme socialist and anarchist experiments of the nineteenth century, the cooperative movement is particularly interesting. Its basic idea was cooperation, not radical criticism or violent action. Beset by competition and other economic difficulties, workers and consumers believed that by pooling their efforts they might save for themselves the profits which went into the pockets of businessmen. The earliest form of cooperative enterprise appeared in the English wholesale and retail business. In 1844 a group of twenty-eight weavers formed the Rochdale Equitable Pioneers. Each member

invested £1; with this capital the group bought at wholesale the groceries that were sold to its members at regular retail prices. A quarterly dividend was declared on the amount purchased. So successful was the venture that similar groups were organized in England and other countries.

A second type of cooperative enterprise was the cooperative in production, in which the distinction between employer and employee vanished and quarrels over wages were obviated. Such cooperatives were not so successful as the Rochdale Equitable Pioneers, chiefly because they lacked the skillful management and resources in money and credit possessed by their competitors, the great business houses. But a third form, the cooperative in credit or in profit sharing, proved more successful. Cooperatives in credit were formed by shares purchased by the members. Money from the fund might be loaned to them or to others, the profits being divided by the members. Profit sharing also proved successful; some businesses paid bonuses, others paid workers a share of the earnings beyond a stated point, and in some cases workers were given shares of stock and thus became part owners.

From England the cooperative movement spread to other countries. The farmers of Denmark have been particularly successful in cooperative farming and dairying. The movement, however, attained its most striking success in Sweden, where houses were built and whole cities laid out by cooperative enterprise. Similar successful cooperatives have been established in Finland, Norway, the Netherlands, Belgium, France, Canada, and the United States. Significant because of the spirit of cooperation, self-reliance, and initiative that they foster, cooperative societies have played an important part in educating people in the social and economic aspects of the problems of citizenship.

Gaining momentum as the decades wore on, the Industrial Revolution profoundly modified every aspect of life. New problems, affecting every class and group, were created. Private business succeeded in making its adjustments by the development of new methods and institutions. Industry fitted itself organically to novel business conditions, thus developing the marvelously successful method of production through mass manufacture. Guided by the researches of scientists, industrialists discovered new processes for the utilization of waste. Conversely, there were panics, depressions, and bankruptcies. The just division of earnings, especially from the laborer's point of view, was difficult to achieve. Numerous ideas were advanced, many experiments made to solve this problem. Some, such as socialism, anarchism, and syndicalism, were extreme in theory as well as practice. More practical were trade unionism, cooperatives, and the counsels of Leo XIII in *Rerum novarum*. In spite of such efforts the problem of the workers remained largely unsolved,

although the steady pressure of the lower groups did result in broadening the voting base of society and the gradual amelioration of labor conditions. Without external interference social and economic problems might have reached a workable solution. But the pressure of militarism and the disasters of the First World War apparently eliminated any possibility of a peaceable solution.

FOR FURTHER READING

ALBJERG, V. L., and M. H. ALBJERG: *From Sedan to Stresa: Europe since* 1870
BEER, MAX: *History of British Socialism*
———: *Life and Teachings of Karl Marx*
CHAMBERLAIN, J. S.: *Chemistry in Agriculture*
CHEYNEY, E. P.: *Industrial and Social History of England*
CHILDS, M. J.: *Sweden: The Middle Way*
COLLINS, J. H.: *The Story of Canned Food*
FAY, C. R.: *Great Britain from Adam Smith to the Present Day*
HAZEN, C. D.: *Europe since* 1815
HEATON, HERBERT: *Economic History of Europe*
HOWE, E. E. (ed.): *Chemistry in Industry*
KAEMPFFERT, WALDEMAR, B.: *Invention and Society*
KRANICH, F. N. G.: *Farm Equipment for Mechanical Power*
LAIDLER, H. W.: *Socialism in Thought and Action*
LEEMING, JOSEPH: *Peaks of Invention*
LINDSAY, A. D.: *Karl Marx's Capital: An Introductory Essay*
MESSER, M. B.: *The Family in the Making*
MUMFORD, LEWIS: *Technics and Civilization*
NUSSBAUM, F. L.: *History of the Economic Institutions of Modern Europe*
OAKESHOTT, W. F.: *Commerce and Society*
QUENNELL, MARJORIE, and C. H. B. QUENNELL: *A History of Everyday Things in England: The Age of Production,* 1851–1934
SCHREINER, OLIVE: *Woman and Labor*
STOCKDER, A. H.: *German Trade Associations: The Coal Kartells*
WARBASSE, J. P.: *Cooperative Democracy*
WEBB, BEATRICE: *Cooperative Movement in Great Britain*

Chapter XLVI

IMPERIALISM, NATIONALISM, MILITARISM

Today the world is an economic unit. Economic disasters and great revolutions which occur in one part of the world are quickly felt everywhere else.—Eduard Fueter

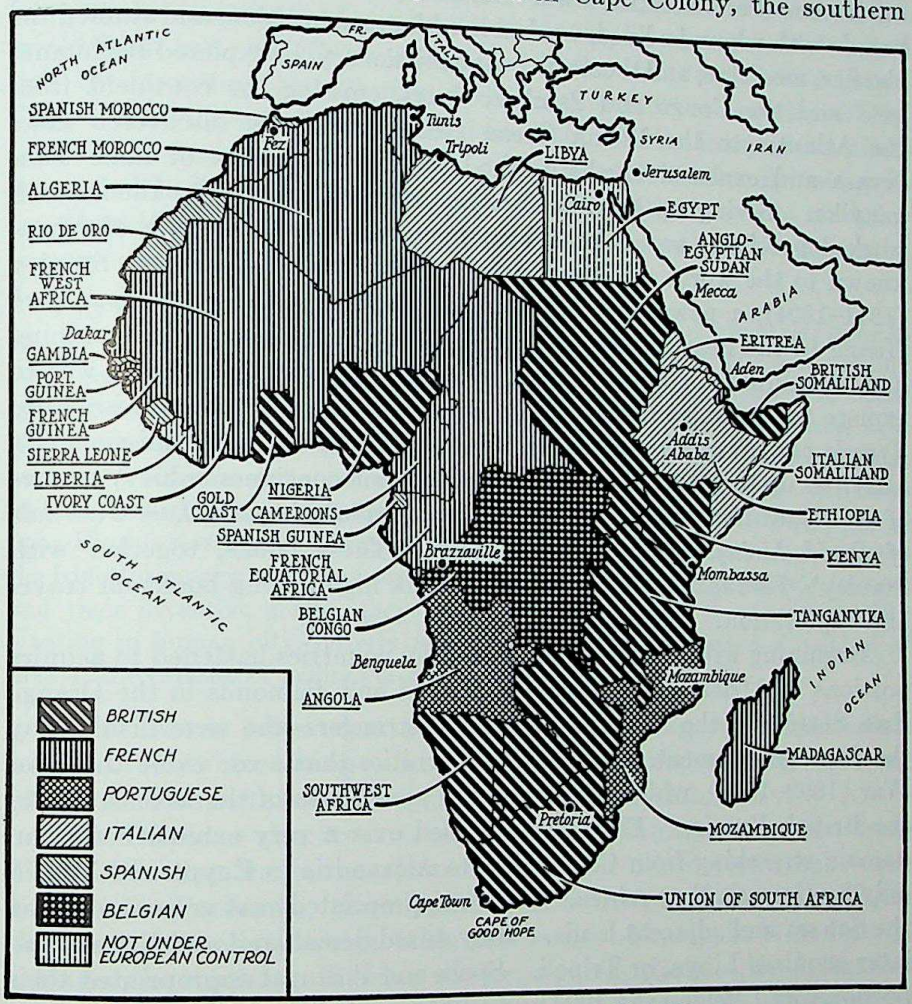
THE structural transformations of the modern state, due to liberalism, industrialism, and the development of bureaucratic government, profoundly affected the character of international relations. Nationalism suffused political activity and colored international policies. Imperialism, the tendency to spread national influence and control over economically backward countries, produced the keenest rivalry and led to the partition of Africa, the annexation of islands in the south Pacific, and the division of China into spheres of influence. Finally, militarism produced dangerous tension in the relations of the major powers. Large armies formed by conscription and provided with the latest devices of destruction produced by the genius of the Industrial Revolution, provoked dangerous wars. Powerful navies composed of armored ships and submarines equipped with torpedoes and radio were employed to enforce imperialistic statecraft.

Colonies more and more came to be regarded as indispensable for markets of manufactured goods as well as sources of raw materials and foodstuffs. At the opening of the Industrial Revolution, in the eighteenth century, England had acquired much of North America, India, Australia, and many insular possessions scattered over the seven seas. Spain retained control of South and Central America and Mexico, but France was forced to yield her American territories to England in 1763. Louisiana was sold to the United States in 1803. The Netherlands acquired the East Indies and made themselves masters of the trade in spices, a most lucrative branch of commerce before the Industrial Revolution. Thus, one hundred years ago, when the process of industrialization began to transform the economic life of such countries as Belgium, France, Austria-Hungary, Germany, and Italy, all really desirable territory available for colonial exploitation had been parceled out among a few nations.

Partition of Africa. Only one continent—Africa—remained comparatively untouched until the nineteenth century. To the people of Europe, it appeared that the vast territory was inhabited by insignificant savages. Actually, the negro tribes possessed a great variety of cultures.

But Europeans, incapable of seeing that these cultures enabled the natives to make a successful living in the African wilds, failed to evaluate them correctly. They believed that the interior of Africa was "unoccupied" or at best inhabited by unworthy and "inferior" people.

The beginning of African partition was made by the Dutch, who during the seventeenth century settled in Cape Colony, the southern



MAP XXXIII.—Africa as partitioned in 1940.

extremity of the continent, which, however, they surrendered to the British in 1815 according to the Treaty of Vienna. Resenting British rule, these Dutch, who called themselves Boers, a word meaning "farmers," migrated northward in 1834 and founded two states, the Orange Free State and the Transvaal, where they remained virtually undisturbed until the closing years of the nineteenth century turned the eyes of European nations to the "Dark Continent."

Until 1840, Europeans knew practically nothing about the vast regions between Timbuktu and Abyssinia on the north and the Zambezi River on the south. Then the London Missionary Society sent out David Livingstone (1813–1873) to carry on the work begun by other missionaries. Born in Scotland, Livingstone grew up in the industrial environment of a Scottish town. He imbibed the religious idealism of the people with whom he lived, worked hard for an education, and studied the classics, medicine, and theology. As a missionary, he explored Bechuanaland and the Congo and Zambezi rivers, crossing the continent from the Atlantic to the Indian Ocean (1854–1856). He discovered Lake Nyasa and explored northern Rhodesia and the region of Lake Tanganyika. Giving up his missionary endeavors in 1857, he thenceforth worked purely as an explorer, bent upon making the interior of Africa known to the world. His work was carried forward by Henry Stanley (1841–1904), a newspaper reporter and traveler sent by the *New York Herald* to the heart of Africa to find Livingstone, about whom nothing had been heard for many months. Stanley's great achievement was to explore the entire course of the Congo River. Livingstone's *Missionary Travels and Researches in South Africa* recounts the great missionary's activities up to 1857. The story of exploration continues in his *Narrative of an Expedition to the Zambezi and Its Tributaries* and *Last Journals of David Livingstone in Central Africa.* These books, together with Stanley's *Through the Dark Continent,* rank high among books on travel and exploration.

Beginning with 1890, various European countries hastened to acquire portions of Africa. The discovery of gold and diamonds in the Orange Free State and the Transvaal attracted strangers who were disliked by the Boer government. Out of the difficulties that arose came the Boer War (1899–1902), which resulted in the annexation of the Boer states to the British Empire. England now ruled over a very extensive African domain stretching from Cape Town to Alexandria in Egypt and broken only by German East Africa. France appropriated vast areas, including the Sahara and adjacent lands. Italy seized Somaliland and Eritrea and later acquired Libya, or Tripoli. Spain and Portugal appropriated their portions, and Belgium in 1907 annexed the rich Belgian Congo.

To the aboriginal tribes, this loss of independence was a calamity; European influences overwhelmed them. Their ancient tribal cultures were undermined; their tribal economy collapsed. The people were exposed to the greed of foreigners whose concern was to gather wealth with little regard for the interests of negro tribes whose ways they could not understand and whose culture they despised. The ideas, habits of life, and industry of Europe were forced upon the tribal life of African negroes. Native negro cultures were threatened with extinction. For

the whites the ultimate consequences of the African conquest are veiled in the uncertainties of the future; but we may be certain that for the negroes it has been at best a doubtful blessing.

European Imperialism in Asia. The peoples of Asia had been subject to European exploitation for centuries. The Netherlands possessed a valuable colonial empire in the East Indies, Portugal owned a few parcels—remnants of a once extensive empire that the Dutch had seized from her—and England occupied India. The Dutch had grown rich by importing into Europe the spices and other luxuries of the East. They did not, however, flood the East with the inexpensive products of the Industrial Revolution. This was left to the British, who controlled India after 1763 and gained great wealth by selling cloth for less than it could be produced by the native weavers. A Catholic missionary wrote as follows in 1816:

> This revolution threatens to ruin India completely. Just before returning to Europe I traveled through some of the manufacturing districts; and nothing could equal the state of desolation prevailing in them. Workrooms were closed and hundreds of thousands of the inhabitants composing the weaver caste were dying of hunger; for through the prejudices of the country they could not adopt another profession without dishonoring themselves. . . . Ah! if the inventors of these industrial developments could hear the curses which this multitude of poor Hindus never tire of heaping upon them! If only, like me, they had seen the frightful misery which has overtaken whole provinces, owing entirely to them and their inventive genius, they would no doubt, unless they were entirely wanting in human pity, bitterly repent having thereby enriched a handful of men at the expense of millions of poor people.

These words make clear two points, why European industrialists wished to introduce their goods into such countries and what devastating effects such importation had upon native economic life.

The Russians also tried to exploit Asia. Interested in furs from Siberia, Russian traders penetrated Siberia and before 1700 reached the Kamchatka Peninsula. Keenly interested in these activities, Czar Peter the Great sent sailors to explore the new lands. Finally, in 1740, Bering, a Danish navigator in Russian service, sighted Alaska. Soon Russian ships appeared in Alaskan waters, engaged in seal hunting. Missionaries and other people besides traders settled at various points, and Russian towns sprang up, extending from the Ural Mountains to Sitka in Alaska. Russian political control was extended over all this region. Turkestan and Amur to the south were annexed, but Alaska was sold to the United States in 1867. The Trans-Siberian Railroad, completed in 1901, led from St. Petersburg across Siberia to Vladivostok, giving Russia a foothold on the shores of the Pacific Ocean. These momentous events revolutionized the life of northern Asia wherever elements of European

civilization took root. The wandering nomads whose raids in ancient times scourged China, India, western Asia, and Europe were now constrained to a more settled way of life.

Meanwhile, other nations secured a footing in China and Japan. Under a policy of complete isolation the Chinese and Japanese avoided all contact, including diplomatic touch, with the outside world. This policy was rudely broken by the Opium War (1839–1842). Using opium in large quantities, the Chinese smuggled it into their country from British India. The efforts of the Chinese government to stop this traffic brought on the siege of Canton by the British. The Chinese were compelled by force of arms to open Canton, Shanghai, and a number of other cities as trading ports for merchants of various countries, give Hong Kong outright to England, and pay a large indemnity (Treaty of Nanking, 1842). Thus Chinese isolation came to an end.

The Chinese Empire, which embraces over 440,000,000 souls, was thrown open to European exploitation, with serious consequences to Chinese culture. The ancient religious culture of the people was affected, and cheap goods from the factories of Europe undermined the handicrafts of the country. Powerless to defend itself, China was forced to make disadvantageous concessions. Foreigners were to be tried only in the courts of their own consuls, tariffs were regulated by distant powers, and foreign soldiers policed parts of the country. Gradually, Western ideas sapped the foundations of Chinese civilization and prepared the way for a colossal cultural revolution, which still is in full progress.

During this time, Japan also opened her gates to European trade and influences after having refused to admit foreigners or permit the importation of their goods for more than three centuries. The policy of exclusion ended in 1854, when an American naval officer, Commodore Perry, arrived in Japan and insisted that protection be given American sailors shipwrecked upon Japanese coasts and that American ships be allowed to secure provisions in Japanese ports. Four years later a treaty was negotiated whereby commercial relations between Japan and the United States were established. Subsequently, similar treaties were made by the Japanese government with other countries.

These events proved revolutionary in the life of Japan. The Japanese readily adapted foreign methods, and Japanese civilization was profoundly modified. A new form of government, modeled after the states of Europe, superseded the ancient feudalism. A new army and navy were organized, and European science, literature, and philosophy were introduced. Missionaries disseminated Christian doctrines. Japan became an industrial power and in the realm of politics borrowed the practices of European imperialism. Within two generations after 1854,

all this had been accomplished—one of the most rapid cultural revolutions in history.

NATIONALISM. Nationalism was a characteristic feature of European political life during the Industrial Age. The sentiment is a more intense one than simple patriotism—that natural affection for the country in which we live and whose civilization we enjoy. The term nationalism as here used denotes the psychological reflex of people living in the new political and economic society that came into existence during the nineteenth century. Although this spirit has many contributing causes and characteristics, attention is called to but a few, as follows: (1) The states created during the nineteenth century were powerful, being able to conscript armies, build navies, raise vast sums of money, regulate business, and advance the economic interests of their subjects. (2) The *bourgeoisie*, which controlled the state, reaped the greatest profits from the new form of state. (3) Speaking a given language, the *bourgeoisie* tended to associate their language with their special economic interests. Hence, nationalism and the expression of affection for a mother tongue and the literature written in it preceded or was accompanied by the rise of the *bourgeoisie* to political power. Submerged groups usually entertain a deep affection for their language and literature. (4) The people who controlled the state desired ever greater advantages or were tormented by fear that enemies beyond the border might defeat them. Hence, propaganda was a significant feature of modern nationalism; the press was used to mold public opinion, the school became a subservient tool to educate its pupils in nationalist ideas, and literature tended to exalt national virtues and instill the idea of superiority over other peoples. (5) A characteristic and most important feature of nineteenth-century nationalism was the conception of race, which we shall now discuss more fully.

Many scholars have speculated on the racial history of mankind. None of their speculations, however, has produced acceptable results. Count Arthur de Gobineau (1816–1882), however, systematized them and added a number of important ideas. The theory that culture is a racial matter springs from his *Essay on the Inequality of the Races of Mankind*, published in 1853. De Gobineau uncritically thought of society as a biological organism and believed that cultural change is due to biological and not moral factors. The evolution of culture, therefore, is a branch of biological science; racial qualities are the foundation of culture. He believed that only three racial groups originally inhabited the earth, white, yellow, and black. The whites are superior, being endowed with unusual energy and creative skill. The yellow are inferior, mediocre in ability, never profound intellectually, and limited in creative ability; but, being practical people, they adopt anything useful. The blacks occupy

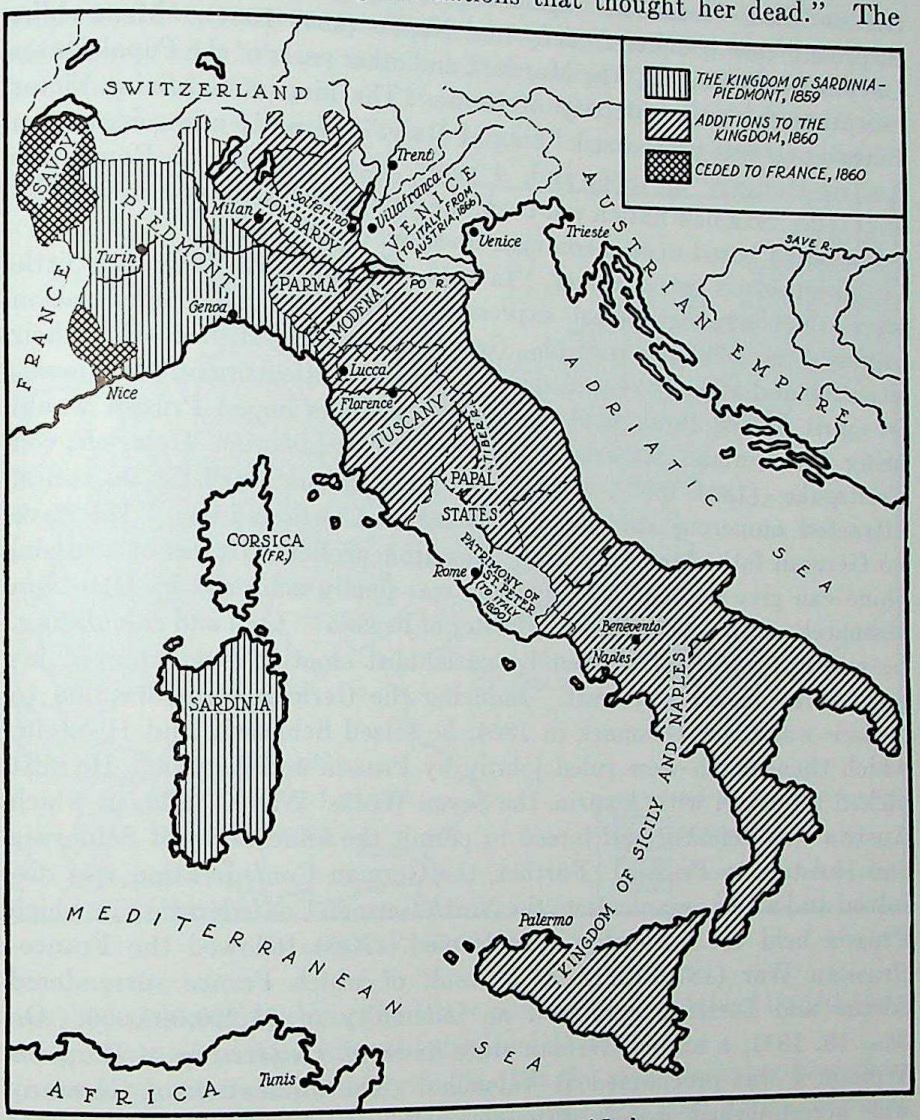
the lowest scale of intellectuality, have no creative ability, and are little above the condition of animals. These racial strains, De Gobineau held, no longer exist in their original purity. There has been much racial mingling so that genuinely "pure races" scarcely exist. De Gobineau believed that the yellow race originated in the Americas and thence swarmed into Asia and Europe. The black race lived in Africa and parts of Asia and Europe. The white race occupied the heights of The Pamirs. A great migration of races began. The yellow forced the black race out of Asia. In the Southwest they mingled, thus producing the Malay and Polynesian groups. The whites migrated westward and occupied Europe, especially the Mediterranean lands. So long as this group maintained its racial purity by not intermarrying with inferior black and yellow peoples, it produced a race of noble and masterful men, the prime creators of civilization. Whenever it mingled with debasing elements, it sowed the seeds of decay. Thus was born the cult of the pure Aryan race of tall, blond, and supremely able people, the chief creators of all that is fine in the history of civilization.

De Gobineau's theory is open to serious criticism. It is far too simple an explanation of a complicated past. Obviously, culture is not racial but an aggregation of the ways of thinking and doing that have grown up during the many ages. The yellow and black races have made many notable contributions to culture. Finally, De Gobineau's theory that culture is a by-product of biological forces makes practically incomprehensible the development of civilization, which, we believe, is based upon moral and intellectual forces.

False as such theories have been proved to be from the standpoint of anthropology, they have nevertheless continued to influence thinking on such matters. Houston Stewart Chamberlain (1855–1927), an Englishman who spent most of his life in Germany, produced an influential book, *The Foundation of the Nineteenth Century*, in which De Gobineau's ideas reappear. It stimulated German nationalist egoism as the Germans were assumed to be the least defiled of the Aryans. This is the basis of the present-day "nordic theory" of the Germans. But other peoples also have been charmed by such romantic theories. Some French writers, for example, have tried to trace the greatness of the French people to their Celtic ancestors. And in the English-speaking world men like Rudyard Kipling have tried to create a national faith in the importance of the "Anglo-Saxon race" for the history of civilization.

Unification of Italy. For centuries, Italians had occupied a leading position in European thought, science, art, literature, and economic life. But they had never created a unified country. The peninsula of Italy after the Treaty of Vienna (1815) was divided among a number of states; Italy was but a geographical expression. These divisions gave

rise to a powerful nationalist movement fanned into a white heat by the patriot Giuseppe Mazzini (1805–1872), who loved Italy more than life itself and believed that, if united and politically reborn, she "would move as an angel of light among the nations that thought her dead." The



MAP XXXIV.—Unification of Italy.

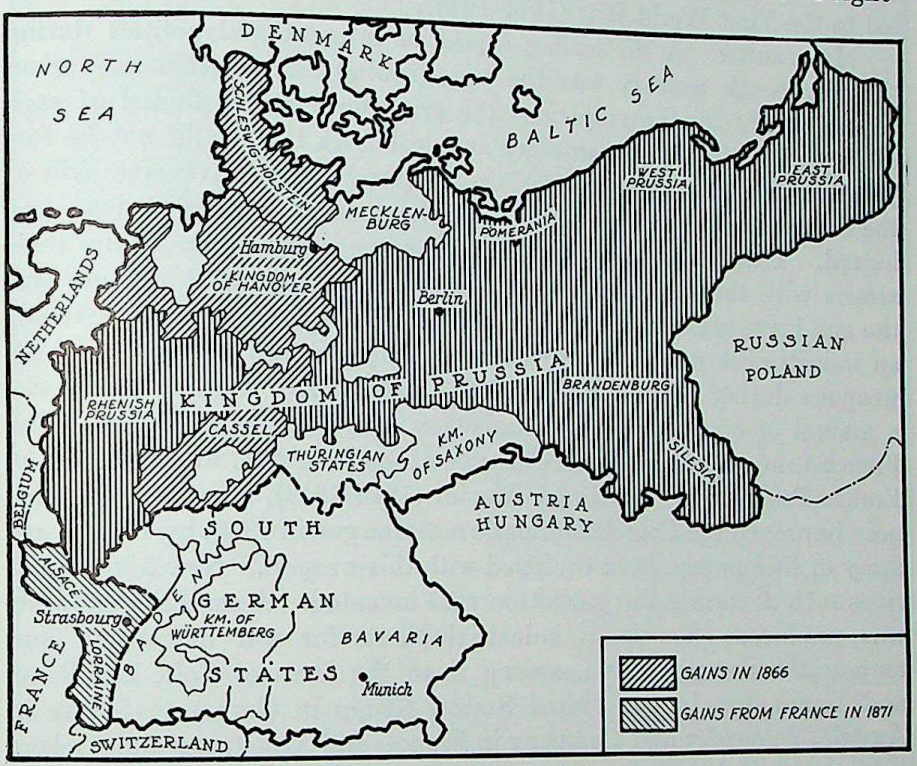
work of this dreamer was carried forward by a realistic statesman, the Count di Cavour (1810–1861), chief minister of the king of Sardinia. He began to unite Italy by means of war. In a brief encounter with Austria-Hungary in 1859, he seized Lombardy, which Austria had held since the French Revolution. His aims were further accomplished by plebiscites, or decrees of the people voted at the polls, held in Modena,

Parma, Tuscany, and Romagna. The work of unification was continued by the firebrand Giuseppe Garibaldi (1807–1882), an impatient patriot who believed in direct action. He headed an expedition of volunteers, the so-called "redshirts," against the kingdom of Naples and with surprising ease conquered Sicily and Naples (1860–1861). Meanwhile, Cavour seized Umbria, The Marches, and other parts of the Papal States excepting the venerable city of Rome. The king of Sardinia, Victor Emmanuel, was proclaimed "king of Italy." Venetia was seized from Austria-Hungary in 1866; and, 4 years later, the city of Rome was annexed. So a new nation was born, the outcome of sustained nationalist propaganda based upon a common tradition of culture.

Unification of Germany. In 1815, Germany, like Italy, was little more than a geographical expression. The German Confederation exercised no effective control. Germans were dissatisfied with their situation and wished to be ruled by a common political organ. Nationalist spirit flamed throughout Germany. Patriots hoped Prussia would bring the German fatherland together. The historian Heinrich von Treitschke (1834–1896), author of strongly nationalistic histories, attracted numerous students by his extreme nationalism. "We have no German fatherland," he said; "the Hohenzollerns [rulers of Prussia] alone can give us one." Unification was finally achieved by Otto von Bismarck (1815–1898), Prime Minister of Prussia. Cool and calculating, he was not swept off his feet by nationalist emotion but achieved his purpose by clever statecraft. Inducing the German Confederation to declare war upon Denmark in 1864, he seized Schleswig and Holstein, which thenceforth were ruled jointly by Prussia and Austria. He next picked a quarrel with Austria, the Seven Weeks' War of 1866, in which Austria was defeated and forced to permit the annexation of Schleswig and Holstein to Prussia. Further, the German Confederation was dissolved and a new organization, the North German Confederation in which Prussia held the leadership, was formed. Next followed the Franco-Prussian War (1870–1871), as a result of which France surrendered Alsace and Lorraine and paid an indemnity of $1,000,000,000. On Jan. 18, 1871, a united German state under the leadership of Emperor William I was proclaimed at Versailles. The unification of Germany was accomplished largely through sustained nationalist propaganda carried on ever since the French Revolution.

Imperialism. Nationalism, which subjected Europe to a series of dangerous political crises, was reinforced by imperialism. The hunt for markets and the scramble for colonies from which European nations might secure raw materials for their factories produced serious crises that repeatedly brought Europe to the verge of war. England, France, and other countries had acquired valuable possessions in various parts of

the earth. Germany tardily sought to win a place for itself. Under the leadership of Bismarck, it formed an alliance with Austria-Hungary in 1879 to protect Austria-Hungary against Russia and itself against France, which was hoping to avenge its defeat in the Franco-Prussian War. In 1882, Italy joined Germany and Austria-Hungary because it was angered when France acquired Tunis, a country in northern Africa that Italy wished to annex. Thus was formed the Triple Alliance to protect the countries comprising it against France and Russia. Fright-



MAP XXXV.—Unification of Germany.

ened by this combination, the latter powers drew together, buried their antipathies, and in 1891 formed the Dual Alliance.

Seeking colonies, Germany found that the most desirable lands had been appropriated. It secured German West and East Africa, however and annexed some islands in the South Seas. These possessions promised little immediate return, but German imperialist ambitions in western Asia seemed to offer substantial advantages. A German firm built the railroad from Scutari, the port in Asia opposite Constantinople, to Konya and in 1903 was given a concession to extend it to Bagdad and the Persian Gulf. This "Berlin to Bagdad Railway" was designed to enable Germany to exploit western Asia and build up a powerful economic empire.

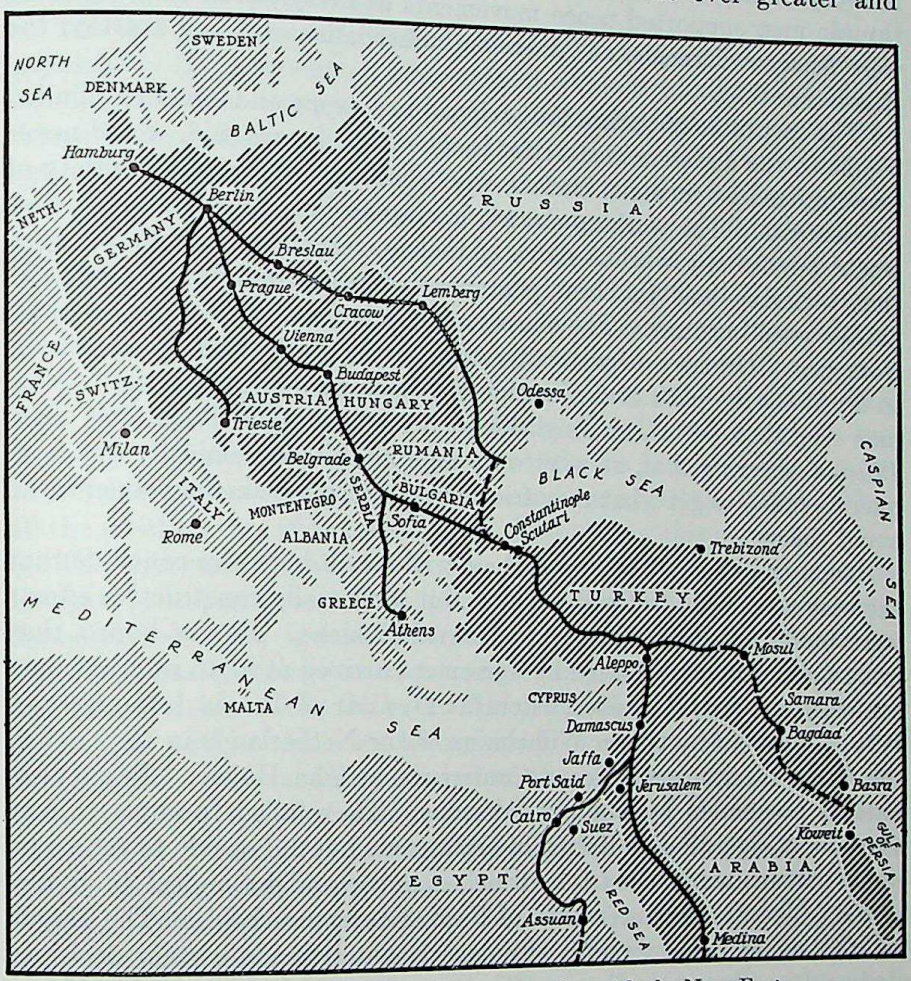
The Germans hoped to secure food, cotton, oil, and minerals from those parts and pay for them in manufactured goods. Such imperialist ambitions roused the apprehensions of foreign powers. Russia disliked to see German power grow in the Balkan Peninsula, and England was opposed to the establishment of a naval station on the Persian Gulf. These antagonisms led to much political maneuvering. In 1907, England joined the Dual Alliance with France and Russia, forming a combination called the Triple Entente. The resulting political misunderstandings led to the First World War (1914–1918).

Militarism. A distressing aspect of international politics during the nineteenth century was the ever-growing danger from militarism caused partly by the suspicions the great powers entertained of each other and partly by the grudges and jealousies that could not be forgotten. The new types of warfare produced by the inventive skill of the Industrial Age also contributed to the mounting suspicion, fear, and hatred. There was keen competition among nations to equip their armies with the latest and most effective weapons. One of these was the gun invented in 1862 by an American, Richard Gatling (1818–1903), an industrialist who had provided the United States government with weapons during the Civil War (1861–1865). His "Gatling gun" was a marvel of efficiency; it fired as many as 350 shots a minute. The French army developed a special type of machine gun, first used in the Franco-Prussian War. Hiram Maxim (1840–1916), an American engineer, improved the French automatic machine gun in 1889; by 1914, every army in Europe had been equipped with this weapon. New high explosives such as cordite and guncotton were invented. A smokeless powder was produced. Enormous industrial plants for war machinery and ammunitions were erected, among them the firms of Colt, Du Pont, and Remington in the United States, Krupp in Germany, Skoda in Austria, Schneider and Company in France, and Armstrong and Vickers in Great Britain. Vast sums were invested in these enterprises; the financial interests represented by these firms contributed to war scares, which stimulated the demand for their products. The German government began to build numbers of submarines in 1906. The possibility of a totally new method of fighting appeared after the invention of airplanes, and by 1914 European armies were being provided with these.

Ever since the French Revolution, it had been a custom to create armies by conscription. Physically fit male citizens of a specified age presented themselves for military training. After a number of years, practically every male citizen had been trained as a soldier, subject to call at a moment's notice. In countries like France and Germany, conscription was applied consistently; in others, as in the Netherlands, there was only a partial conscription; Great Britain and the United States

relied upon volunteers. Preparation for war was rapidly becoming the chief industry of the nations.

Debts contracted to pay for past wars and to create national fighting machines rose to fabulous proportions even before the First World War broke out in 1914. Afterward, these debts became ever greater and



MAP XXXVI.—German railroad connection with the Near East.

interest charges more and more burdensome. The following table lists the approximate total military debts in 1914 of the nations concerned:

Country	Debt
France	$6,283,675,000
Russia	4,553,488,000
Great Britain (exclusive of colonies)	3,485,818,000
Italy	2,706,609,000
Germany	1,177,418,000
United States	1,028,344,000

Pacifist Movements. The folly of the military and naval competition and the piling up of huge debts described above was evident. Small wonder that the nineteenth century with its humanitarian sentiments developed pacifist tendencies. Peace societies came into existence in every country; by 1914, there were about 160. Influential and philanthropic men supported peace movements in every land. Among these were Andrew Carnegie, an American industrialist, and Leo Tolstoy, the Russian author.

The incurable optimism that reigned in Europe and America blinded people to the disasters in store for them. War, it was said, would never be permitted by financial leaders, who would not endanger the safety of investments. The working classes, having nothing to gain from a war, would oppose any warlike move of their governments. Some believed that socialism was the best guarantee of peace; surely the Socialist parties would protest. The Christian churches would turn people away from war. Others optimistically thought the world had "progressed" so far along the path of civilization that men had outgrown war. Norman Angell (*b.* 1874), an Englishman, wrote a popular book, *The Great Illusion*, showing that, as wars were unprofitable economically and conquerors failed to get what they tried to seize, peoples should cooperate to avoid them.

Today as we look back upon these well-meant hopes we conclude that the wish was father to the thought. But some really constructive efforts were made to check military and naval rivalries. It was hoped that armaments might be limited by agreement arrived at in an international conference. With this idea, Nicholas II, Czar of Russia from 1894 to 1918, supported by Queen Wilhelmina of the Netherlands in 1899 called the First International Peace Conference at The Hague. Twenty-six nations responded by sending delegates. They failed to come to any agreement regarding limitation of armaments but did decide to set up an impartial arbitration court to which countries might appeal their disputes. The Second International Peace Conference held at The Hague in 1907 again failed to limit armaments, but it made certain decisions designed to "humanize" war. The use of gas in battle was forbidden. A number of other measures were accepted; and although these fell short of what had been hoped, many thought there were grounds for optimism. A third conference was to be held in 1915 from which greater progress was expected.

First World War. The year 1914 will long retain special significance, for then began the disastrous First World War. Conflicts fought on such a gigantic scale as was this one, with the vast financial, commercial, and industrial resources at the disposal of modern states, are peculiarly destructive to life, property, and national power. A

modern war is fought and paid for by the savings of decades of labor and industry, by colossal sums borrowed during the course of the conflict, and, finally, by repudiation of debts, thus ruining the thrifty and energetic. Victors as well as vanquished suffer untold losses. The widespread ruin, grief, and bitterness that resulted from the First World War required a painful period of recuperation.

To state the causes of the First World War in a succinct manner is impossible. It grew out of international rivalries resulting from long-standing national hatreds, economic antagonisms, military and naval competitions, alliances such as the Dual Alliance and Triple Entente against the Triple Alliance, and the constantly growing fears encouraged by propaganda. These causes may be analyzed in minute detail, but such a task lies beyond the scope of this book. The immediate cause, the spark that ignited the explosive passions, is difficult to determine. To allocate the blame correctly requires a divine sense of justice. Suffice it to state that Germany, Austria-Hungary, Bulgaria, and Turkey were confronted by France, England, Russia, Belgium, and Japan in August, 1914. In 1915, Italy deserted her alliance with Germany and Austria-Hungary and joined their enemies. In 1917, the United States together with other powers in the Western Hemisphere joined the Allies. Thus, all the great powers of the world were embroiled in this conflict.

The war came to an end in November, 1918. Germany, Austria-Hungary, Bulgaria, and Turkey had mobilized all their man power, financial resources, industrial organization, and scientific knowledge. They lost, partly owing to a fact that for the past two hundred years has played a decisive role in the great European wars. This is the principle that those powers win wars who control, through a preponderance of naval power, the commercial lanes on the high seas whereby the raw materials, food supplies, and industrial products of the world may be imported in unrestricted fashion. The British and French navies controlled the sea, thus guaranteeing for themselves access to the almost inexhaustible supplies of raw materials and foodstuffs produced by North and South America, Africa, and Australia. Mastery of the sea enabled them to shut Germany and her allies off from these supplies, thus instituting a rigid blockade that steadily undermined the morale of their enemies. The entry of the United States in 1917 made available a steady stream of soldiers, a vast amount of equipment, and liberal sums of money, which quickly turned the scale. Turkish, Bulgarian, Austrian, and German resistance collapsed; and on Nov. 11, 1918, an armistice was declared.

The cost of the war in loss of life was shocking. The Allies including the United States had brought a total of about forty million men into the field, Germany and her allies about half that number. The number of

deaths in battle or from wounds or accidents is estimated at about ten million, the wounded at about twenty million. In addition, one should take into account the increased infant mortality, death rate among the aged, insanity, and general impairment of health among the civil population, for which no statistics can be given.

Appalling also was the financial cost of the war. If the nations were heavily encumbered by reason of military and naval expenses on the eve of the war, they now appeared on the verge of bankruptcy. The total direct cost of the First World War has been estimated conservatively at about $186,000,000,000. The approximate debts of the chief warring nations at the opening of 1920 are given in the following table:

Country	Debt
Germany	$40,000,000,000
Great Britain	37,769,000,000
France	34,842,000,000
United States	26,194,977,000
Austria-Hungary	25,731,619,000
Italy	10,359,275,000
Belgium	2,502,824,000

Such figures, however, give an inadequate conception of the tremendous losses caused by the conflict. The bitterness that sprang from the destruction of families, the blasted security and ruined prestige of the middle classes, and the thwarted hopes of a whole generation can never be evaluated. The reaction to these experiences as well as the injustices occasioned by the treaty settlements after the war had serious consequences that complicated the problems of reconstruction. Directly or indirectly these disasters are, in part, the cause of the miseries and tribulations that oppress mankind at the present moment.

The character of the war had changed markedly the moment the United States entered on the side of England and France in April, 1917. The American declaration of hostilities produced an electrical effect; after struggling for 2½ years the armies appeared in a condition of stalemate. The United States possessed almost unlimited resources in money, materials, and man power, which were placed at the disposal of the Allies. But American prestige at this moment was incalculably great for another reason. President Woodrow Wilson, a staunch believer in democratic ideals of society and government, had expressed his opinions about a just termination of the war. On Jan. 8, 1918, he outlined his famous Fourteen Points which, he believed, would form the basis of a lasting peace. This document stated that (1) "diplomacy should proceed frankly and in the public view"; (2) the seas should be free in war as in peace; (3) all economic barriers should be removed, as far as possible; (4) national armaments should be reduced to the minimum;

(5) colonial claims should be adjusted with due regard to the size of population of European states; (6) Russian territory was to be evacuated; (7) Belgium was to be evacuated and her full independence restored; (8) French territory was to be evacuated and Alsace-Lorraine restored to France; (9) Italian frontiers were to be rectified so that Italians living outside Italy would be joined to their mother country; (10) the peoples subject to the Austrian Empire were to form autonomous states; (11) Rumania, Serbia, and Montenegro were to be evacuated, and Serbia was to receive an outlet to the Adriatic Sea; (12) the nationalities subject to Turkey were to have their development autonomously, and the Dardanelles was to be free to the navigation of all peoples; (13) the Polish people were to form an independent state with access to the Baltic Sea; (14) a League of Nations to regulate disputes among the nations was to be created.

The Peace Conference of Paris failed to meet all the claims and issues with justice. Its work was carried on by committees; and many concessions were made to satisfy nationalist claims, some of which were unwise. By the Treaty of Versailles (1919), the map of Europe was remodeled, the colonial possessions of Germany were redistributed, and other questions, including the debts of Germany, were summarily settled. Germany was required to assume the cost of the properties it had destroyed in Belgium and France; the bill, finally presented, amounted to $32,000,000,000 to be paid in gold marks. The total German debt therefore amounted to the sum of $72,000,000,000. Further, German boundaries were redrawn. Alsace and Lorraine were returned to France; Eupen-et-Malmédy was given to Belgium; a part of Schleswig was given to Denmark, following a plebiscite; Polish territories with German minorities were turned over to the newly constituted republic of Poland; Danzig with its adjacent territory was made an independent free city. Memel on the Niemen River was likewise formed into a new political entity.

The countries associated with Germany were likewise profoundly affected. Austria-Hungary vanished, and in its place appeared a new Austria, southern Tirol being given to Italy and the South Slavic lands surrendered to Yugoslavia. Hungary emerged as a separate state, but Transylvania was given to Rumania. The Czechs and Slovaks, together with some of the Ruthenians, were united in a new state named Czechoslovakia. Bulgaria and Turkey had to accept drastic modifications of their frontiers. These were not the only changes demanded by the peace treaties; in addition, there were provisions regarding reparations and economic matters.

The Industrial Revolution, which in its early stages seemed to offer an almost utopian solution of economic problems, evoked conflicts the

issue of which even today remains unpredictable. Forces controlling commerce and industry induced governments to adopt imperialist policies, which appeared to satisfy business needs by opening up sources of raw materials and providing markets for manufactured goods. The spirit of nationalism, however, prevented the peaceful development of imperialist practices. Long-standing political quarrels, envenomed by imperialist antagonism, resulted in bitter wars of which the First World War was most disastrous. What made these conflicts so destructive in life and wealth was the character of militarism. Governments made use of every destructive device developed by the Industrial Revolution.

FOR FURTHER READING

BARNES, H. E.: *An Economic History of the Western World*
———: *The History of Western Civilization*, Vol. II
BARZUN, JACQUES: *Race: A Modern Superstition*
BINKLEY, R. C.: *Realism and Nationalism*, 1852–1871
BIRNIE, ARTHUR: *An Economic History of Europe*, 1760–1930
FUETER, EDUARD: *World History*, 1815–1920
HAMMOND, L. J., and BARBARA HAMMOND: *The Rise of Modern Industry*
HAZEN, C. D.: *Europe since* 1815
HEATON, HERBERT: *Economic History of Europe*
HICKS, J. D.: *The Federal Union*
KAEMPFFERT, W. A. (ed.): *A Popular History of American Invention*
OSGOOD, E. L.: *A History of Industry*
QUENNELL, MARJORIE, and C. H. B. QUENNELL: *A History of Everyday Things in England: The Age of Production* 1851–1934
SIMAR, THÉOPHILE: *Race Myth: A Study of the Notion of Race*
SIMONS, F. H., and BROOKS EMENY: *The Great Powers in World Conflict*

Chapter XLVII

GROWTH IN THE NATURAL SCIENCES

Please observe, gentlemen, how facts which at first seem improbable will, even on scant explanation, drop the cloak which has hidden them and stand forth in naked and simple beauty.—Galileo

THE development of the experimental sciences has been one of the most influential factors in modern culture. Kepler, Copernicus, Galileo, Harvey, and Huygens by the close of the seventeenth century had revolutionized ancient conceptions about nature. Newton revealed a closely interrelated universe whose every part obeys the dictates of comprehensive mathematical law. From 1727 onward, scientific information grew at an increasing tempo; every aspect of nature was regarded as a subject for special exploration, and the first outlines of the separate sciences of geology, physics, and chemistry were formulated. Knowledge of the physical world became more accurate and more adequate; in certain branches of science the changes appear almost revolutionary. The application of the new scientific knowledge to the uses of everyday life has radically transformed ways of living.

The development of separate and independent sciences, however, still had obstacles to overcome. Men were in the habit of trying to master the entire field of learning, to be encyclopedic. In spite of the example of Newton, Huygens, and others, students were reluctant to devote years to the patient study of a particular aspect of nature, tabulate results, and postulate tenable theories and hypotheses. Another handicap to progress was the typical classical education common to the times. The schools of the eighteenth century still taught Latin, Greek, and mathematics but placed little emphasis upon the study of nature. Students and teachers failed to suspect the magnitude of science and its vast possibilities.

Beginnings of Geology. Deterred apparently by the biblical account of Creation in six days, university professors failed to encourage the study of geology. But there were some observers who did raise pertinent questions. Men often found curious fossils of marine life high up in the mountains and far from the sea. The inquisitive Leonardo da Vinci noted them and drew the inference that fossils were found in high altitudes because such areas had once been covered with water and that valleys and plains had been formed by erosion. But for generations

it was believed that fossils were freaks of nature or had been deposited on mountain sides at the time when Noah's flood had covered the earth. A Dane, Nicolaus Steno (1638–1686), made the first notable progress in the examination of fossils and the strata in which they were found. He showed that fossils were the remains of animals embedded in layers of sediment. He noted further that strata usually were horizontal but sometimes were tilted by underground explosions or had collapsed because of erosion. Such observations were to lead ultimately to the creation of the science of geology.

The next noteworthy contributor to geological knowledge was Abraham Werner (1750–1817), a German whose ancestors for centuries had been practical miners. A teacher in the mining school at Freiberg in Saxony, he studied rocks chemically and structurally and made important contributions to crystallography. From his observations of veins of ore and their geographical distribution, he deduced that originally a vast ocean had covered the earth and that its waters had held in solution the materials from which minerals were formed. He held that these materials had settled to the bottom in a fixed order, producing layers, or strata. Finally, the ocean disappeared—how and where the water went could not be answered—leaving a variety of formations over the entire earth. He was the first to identify granite as the most ancient form of rock and reasoned that the sedimentary strata were deposits of the primeval ocean. Mountains and plains were formed by erosion. The youngest deposits, Werner believed, were formed by volcanic eruptions, which had poured forth lava.

Meanwhile, Giovanni Arduino (1713–1795), an Italian scholar and a younger contemporary, laid the foundations of geological chronology. An enthusiastic student and collector of fossils, he divided the rocks of northern Italy into primary, secondary, tertiary, and volcanic. So accurate were Arduino's observations that his main conclusions about a succession of ages in the history of the earth's crust have become a permanent feature of geological science. Early geologists as a rule believed that a primeval sea once covered the earth and hence were called "neptunists." But others, the "vulcanists" or "plutonists," held that heat also had played a vital part in earth formation. This view was put forward by James Hutton (1726–1797), a Scot who in 1795 published his influential *Theory of the Earth with Proof and Illustrations.*

By this time, investigators of geological problems were following sound methods. Charles Lyell (1797–1875) began the study of geology while a student at Oxford. Watching the excavations for the Nelson monument in Trafalgar Square in London, he noted the strata of the earth and made observations on the ancient sea bed uncovered by the workmen. In 1828, he visited the region around Clermont-Ferrand in France, where he found

that a certain river gorge once had been dammed up by a stream of lava and had formed a lake, which during succeeding ages had slowly cut a new outlet through basalt and gneiss. To Lyell, these facts were proof that nature could and did reshape the earth's crust. Later he visited southern Italy, where he saw fossils embedded in rocks 2,000 feet above sea level and conceived the idea of classifying the Tertiary formations of the Cenozoic Age into four divisions, Eocene, Oligocene, Miocene, and Pliocene—terms still in common use.

Lyell was a systematizer of geological studies as well as an original investigator. His *Principles of Geology* in three volumes, which appeared from 1830 to 1833, became a scientific classic and popularized the new "uniformitarian" theory of geology. Following the neptunists and vulcanists, many believed that a series of catastrophes was responsible for the earth's crust. But Lyell held there had been a uniform development of the earth's surface and emphasized glaciation, sinking and elevation of land, erosion by wind and water, and cutting of gorges by rivers, arguing for an orderly evolutionary process, not a series of catastrophes.

Geologists after Lyell began to specialize in various branches of their subject. Louis Agassiz made remarkable contributions to glacial geology. Born in Switzerland in 1807, he became interested in the subject of fishes and in 1836 issued his *History of the Fresh Water Fishes of Central Europe.* From the study of living fishes, Agassiz passed to fossilized fishes found in the rocks of Switzerland. The result, five splendidly illustrated volumes of *Researches Relating to Fossil Fishes*, appeared in 1844; this work established his reputation as a paleontologist and ichthyologist.

Soon the subject of glacial geology engrossed Agassiz' attention. Studying Swiss glaciers, he learned much about moraines, the grooving and rounding of rocks over which glaciers traveled, and many other matters. He saw how glaciers carried masses of stone and concluded that ages ago Switzerland had presented an appearance like modern Greenland. From such studies, he argued that countries where unstratified gravel or boulder drift is found had once been covered by glaciers. In 1840, Agassiz published his monumental *Study Relating to Glaciers* in proof of his theories. He received an invitation to join the faculty of Harvard University, to become the first great teacher of geology in America. He traveled widely over the United States accumulating a vast collection of specimens for the Harvard Museum of Comparative Zoology. Loaded with honors and rich in achievement, Agassiz died in 1873.

The development of petrography, the microscopic study of rocks and fossils, was begun by William Nichol (1810–1870), a capable scientist and deft workman and a professor of natural philosophy in Edinburgh. He hit upon the idea of making cross sections of rock by cementing specimens to glass and grinding them down until they became transparent. Placed

under a microscope, they revealed the minutest mineral or vegetable structure, thus enabling geologists to explore the earth's crust in the minutest fashion. Nichol, however, did not receive the recognition due him until his notes and collections came to the attention of Henry Sorby, who appropriated the new methods in his *Microscopical Structure of Crystals* (1858).

Progress in Astronomy. The science of astronomy had come of age long before geology, but there was a lull in progress following the death of Newton in 1727 until Pierre Simon de Laplace (1749–1827) became interested in astronomy. A professor of mathematics, he spent his leisure reflecting on the problems of celestial mechanics. In 1796, Laplace published his epoch-making *Système du Monde*, or *System of the Universe*, which contained a short history of astronomy, an outline of Newtonian astronomy, and Laplace's own theory known as the "nebular hypothesis." Impressed by their elliptical path, he speculated that the sun, moon, stars, and planets of the solar system had originally sprung from one and the same source. He believed that space had once been occupied by a vast rotating nebula of incandescent gas out of which were formed the sun and the planets. By the action of centrifugal force, rings of nebulous matter were thrown off, which continued to revolve and in due course formed independent globes, constituting the planets and their satellites. The nebular hypothesis, one of the most audacious theories yet advanced, upset many ancient scientific beliefs.

Less spectacular but equally important for astronomical science was William Herschel (1738–1822), who produced telescopes far superior to any yet constructed. His great telescope of 40 feet focal length was set up near Windsor, England. In March, 1781, he discovered the planet Uranus, whose passage in its orbit around the sun requires 83 years. Herschel became suddenly famous, and King George III awarded him an annual pension of £300 (about $1,500). He constructed a larger telescope, embodying a number of important improvements, by which he was able in 1789 to discover a sixth satellite of Saturn. Then he turned his attention to the Pleiades. Galileo had counted twenty-eight stars in this group, but after prolonged observations Herschel counted at least 2,300. He also studied the Milky Way and learned that there were many more stars in it than any astronomer had ever imagined. He estimated that in 40 minutes something like 258,000 stars passed across the field of his telescope. Herschel also discovered a large number of multiple or double stars, both of which revolve in an elliptical orbit about a common focus.

Astronomers were puzzled to find that the path Uranus followed did not exactly conform to Newton's law of gravitation. There was so much speculation that a Cambridge undergraduate named John Couch Adams (1819–1892) began to investigate the problem. By 1845, he had dis-

covered the theoretical position of a planet traveling in an orbit that seemed to explain the wandering course of Uranus. About the same time a French mathematician, Urbain Leverrier (1811–1877), made the same discovery. On the night of Sept. 23, 1846, a German astronomer turned his telescope toward the place in the heavens that Leverrier indicated was occupied by the unknown planet. He discovered a pale green disk; this was Neptune, whose orbital revolution was found to require 164.6 years.

Analysis by means of the spectroscope, developed in 1859 by two workers in physics, Gustaf Kirchhoff (1824–1887) and Robert Bunsen (1811–1899), further revolutionized the study of astronomy. By means of the now familiar Bunsen burner, vaporized substances could be identified by distinct patterns of their light when it was passed through a prism. This idea applied to astronomy revealed that rays from stars produced spectra identical with those of substances vaporized by a burner. Thus astronomers were enabled to determine the physical nature of stars, no matter how far away they might be. This branch of astronomy, known as astrophysics, revealed many new facts about the nature of the stars and made the problems of astronomy more intricate than men like Copernicus, Kepler, Galileo, and Laplace ever dreamed they could be.

One of the greatest of observers after William Herschel was Giovanni Schiaparelli (1835–1900), an Italian genius. He showed that comets tend to cease shining and become meteor streams as they course through the heavens. His special study of three planets—Mars, Venus, and Mercury—revealed the existence of "canals" on Mars, a discovery rejected by other astronomers because they did not have Schiaparelli's keen vision. After 15 years' close study, Schiaparelli was able to state that "the climate of Mars must resemble that of a clear day upon a high mountain." His observations showed that Mercury and Venus each perform but one rotation on their axes as they travel along their orbits. He also made studies of the Milky Way and laid the foundations for the great work of the astronomers whose names have become famous in recent years.

Physics and Chemistry. There were striking changes in knowledge concerning matter and the principles that govern it. The vast world of substances may be studied with reference to their composition and the transformations that they undergo; this is chemistry. On the other hand, the world of inanimate matter may be studied from the point of view of motion; this involves mechanics, sound, heat, light, electricity, and radiation and constitutes the science of physics. Many scientists studied physical and chemical phenomena and made noteworthy contributions to the knowledge of each. As the two sciences overlapped at many points, we shall trace their development together.

Since the days of William Gilbert of Colchester (*d.* 1603), who wrote the famous *On the Magnet*, there had been little study of electricity, but

the subject continued to arouse interest. Charles Dufay (1698–1739), a Frenchman, discovered that all bodies could be electrified, and demonstrated that Gilbert's teaching that some bodies were "electric" and others "nonelectric" was erroneous. Noticing that electrified objects sometimes attracted and sometimes repelled each other, he held that there were two electrical fluids which, separated by friction, were neutralized when they combined. The next step was to produce static electricity by means of a friction machine. This notable discovery was made by Pieter van Musschenbroek (1692–1761), a professor at the University of Leiden. One day he tried to electrify water in a bottle. His assistant held the bottle in his hand for a few minutes, then tried to remove the wire connecting the friction machine with the water, and received a sharp shock. Thus was discovered the Leyden jar, a device still used to demonstrate the properties of static electricity. News of this discovery became known abroad, and the celebrated Abbé Nollet of Paris repeated the experiment on himself and on others. He caused an electrical current generated by a friction machine to pass through a 900-foot line of Carthusian monks. To their amusement, they all jumped at the same time.

Benjamin Franklin (1706–1790) discovered that pointed metal bodies are more effective than blunt ones in attracting and repelling electrical currents. He held that electricity was a common element present in all bodies and composed of one fluid, not two as Dufay had held. Whenever a body received more than its normal portion of it, the electricity was said to be *plus;* if less, it was *minus*. Franklin believed that lightning is an electrical discharge and proceeded to prove his theory by means of a famous experiment. He sent a kite up into a cloud during a thunderstorm, proposing to bring electricity down the cord. Soon he received a strong shock. He charged a Leyden jar with the electricity. The jar gave a shock as if it had been charged by a friction machine. This proved conclusively that lightning is an electrical phenomenon. Possessing a practical mind, Franklin conceived the idea of conducting lightning from buildings to the ground, to prevent fires, and so originated the lightning rod of common usage.

Current electricity proved to be of more practical importance than static electricity and revolutionized the study of physics. Luigi Galvani (1737–1798), a professor of anatomy at the University of Bologna, placed frog legs near the conductor of a friction machine and, by touching them, caused them to twitch. This interested Alessandro Volta (1745–1827), a professor of natural philosophy at the University of Pavia. He showed that an electrical current was produced at the contact of two different metals, one of which became charged negatively, the other positively. From these experiments Volta produced the voltaic pile, the forerunner

of the electric battery, made by placing a wet cloth dipped in a salt or an acidulated solution between a piece of zinc and a piece of copper. Arranging a number of such pairs of cells in a series, Volta was able to produce a steady current of electricity.

The discovery of electromagnetism was the next step in the development of electrical science. Hans Oersted (1777–1851), a professor at the University of Copenhagen, was lecturing in 1819 on the phenomena of electricity, illustrating them by means of a voltaic pile. Before him lay a compass, which he accidentally pushed close to a bar of copper through which a current of electricity was to be passed. Turning on the current, he was amazed that the needle turned so that it stood at right angles to the direction in which the current was flowing; when he reversed the current, the needle turned in the opposite direction. Obviously, electricity and magnetism were closely related.

To André Ampère (1775–1836), a precocious youth who early mastered the science of mathematics, belongs the honor of making the next discoveries. Oersted's experiments interested him so keenly that he repeated them in every way conceivable and reported a number of remarkable discoveries. He found that when an electrical current passes along a wire from south to north and a magnet is held under the wire the north point of the compass needle points to the west, but when the magnet is held above the wire the needle points eastward. This soon became known as "Ampère's rule." Ampère also discovered the influence of one current upon another—that parallel currents running in the same direction attract each other and that those running in opposite directions repel each other. Finally, Ampère showed it was possible to magnetize a bar of steel by winding wire around it and sending a current through it, thus producing an electromagnet.

Further progress was made by George Ohm (1787–1854), the son of a Bavarian locksmith. A clever experimentalist, Ohm hit upon the principle governing the conductivity of metals. In testing the capacity of metals to transmit electrical currents, he found that the conductivity of a wire depended upon its material, its length, and its sectional area. He set up a scale at the head of which he placed copper with a value of 1,000. Other metals that carried electrical current less readily were given correspondingly lower values. As it was difficult for Ohm to secure wires of uniform size in the various materials, his table was not absolutely accurate. Ohm in 1827 produced his famous work, *The Galvanic Chain Mathematically Worked Out*, the most important treatise on electricity published so far. Unfortunately, its high scientific value was ignored, and the book remained unnoticed. Ohm had long cherished the ambition of becoming a university professor; but scientists and authorities who disposed of coveted university posts ignored him,

and many persons of lesser achievement and inferior ability received appointments that he would have been glad to accept. Gradually, his work became known abroad; and finally in 1848, when sixty years old, he was made a professor at the University of Munich. It is a pleasure to reflect that the names of Galvani, Volta, Ampère, and Ohm are perpetuated in the vocabularies used daily by students of the natural sciences.

Meanwhile physicists were overturning theories concerning light, refuting Newton's generally accepted principle. Even Huygens's theory that light consists of waves in the ether was neglected until Thomas Young (1773–1829), an English physician, revived it and produced his principle of the interference of light. Many scientists refused to be convinced of the theory of light waves until the question was settled by the Frenchman Jean Foucault (1819–1868), who in 1850 proved that light travels at the rate of 185,000 miles per second in the air and about three-fourths as fast through water. Thus only after his death was Thomas Young's work shown to be correct.

Physicists were also revising ancient theories about heat. For some time, it had been believed that an elusive fluid called "caloric" permeated all substances and produced heat. The theory that in combustion a material called phlogiston was given off implied that heat was a material thing. This idea was overthrown by a famous American scientist, Benjamin Thompson (1753–1814), more generally known as Count Rumford. Born in Massachusetts, he took part in the American Revolution but later moved to England and spent most of his life there and in Europe. He entered the service of the elector of Bavaria and as a reward for his work in improving industry, education, and military training was made a count of the Holy Roman Empire. Always interested in experimentation, he made observations on how heat is generated. He took a partly drilled cannon, placed a blunt steel drill in it, put a 5-ton weight upon it, and immersed the point of the drill in a gallon of water. The drill was then revolved at a speed of 32 revolutions per minute. The temperature of the water at the beginning of the experiment was 60°F. At the end of 1 hour, it had risen to 107° and after 2 hours 20 minutes had begun to boil. Considering every possible explanation, Count Rumford decided that heat was nothing but matter in motion and in 1789 published his revolutionary *Inquiry concerning the Source of Heat Which Is Excited by Friction.*

Sir Humphry Davy (1789–1824), an English scientist who was much influenced by Lavoisier's researches in chemistry (see page 839), made some noteworthy contributions to Count Rumford's theory. He produced an apparatus whereby two cubes of ice were rubbed together in the exhausted globe of an air pump. In a few minutes the ice dis-

appeared and the resulting water registered 35°F., which was higher than the temperature of the air in the room. As the heat had come neither from the air nor from the air pump, Davy argued that friction alone had raised the temperature of the ice so that it melted. Finally, in 1812, he stated that "the immediate cause of heat is motion and the laws of its communication are precisely the same as the laws of the communication of motion."

To encourage scientific research, Count Rumford in 1799 founded the Royal Institution in London. There Davy when twenty-two years old had begun to lecture on chemistry. The most significant of his many discoveries was the application of electricity to chemistry. Other scientists had noticed that, when the terminal wires of an electric battery were dipped into water, bubbles of oxygen rose from one wire and hydrogen from the other. After many experiments, Davy decided that he had discovered a new method of chemical decomposition, that of electrolysis as it was called later, and used this method to decompose potash and soda, two substances that chemists had believed were elements.

Davy's name is also associated with the miner's safety lamp. Explosions in deep mines had become common, and Davy was asked for advice. He collected some of the explosive firedamp and, after a fortnight's study, produced the safety lamp (1815), a simple device that enclosed the flame in a protective metal screen. He could have patented the device and made fabulous sums but magnanimously refused to profit from an invention that would save many lives. Another invention of Davy's was the arc light, a device commonly used for lighting streets and theatrical productions a generation ago.

Davy's greatest discovery was Michael Faraday (1791–1867), one of the most able and successful scientific experimenters of the nineteenth century. Born of poor parents, he attended Davy's lectures at the Royal Institution. He had an observant mind and lost no opportunity to learn. Soon he began assisting with experiments and became private secretary to Davy. Interested in the earlier experiments in electromagnetism, he carried out a number of experiments of his own. He knew that electricity could magnetize—but could magnetism electrify? Finally he stumbled on the answer—motion. Faraday set up an apparatus by which he rotated a metal core through a magnetic field. When this apparatus was connected with a galvanometer, a continuous current of electricity was registered on the dial. This remarkable discovery in electromagnetic induction is the basis of the modern dynamo. He also discovered the basic law of electrolysis, that the amount of gas produced depends exactly upon the quantity of electricity passed through the the substances. The formulation of this principle, like that of the dynamo, produced momentous results for science and industry.

The next great pioneer in physics was James Maxwell (1831–1879), Professor of Natural Philosophy at the University of Aberdeen, who reduced Faraday's discoveries in electricity to their mathematical formulas. Having conducted a number of successful experiments he came to the conclusion that electromagnetic vibrations might account for the properties of light. But laboratory proof that electromagnetic disturbances are transmitted as waves had to wait for simple demonstration by Heinrich Hertz (1857–1894). Hertz took two zinc plates to which he had attached metal rods ending in polished brass knobs and placed them in contact with the poles of an induction coil. When the plates were charged and the knobs brought close together, a series of sparks began leaping back and forth. This proved that electrical currents could be made to pass through the air. Hertz also devised a clever yet simple device whereby electrical waves could be detected and received. These Hertzian waves, as they came to be called, were shown by their discoverer to behave like light waves. These discoveries made wireless telegraphy a scientific possibility.

Students of physics were also deeply interested in the mechanical equivalent of heat, a problem solved by James Joule (1818–1889), a brewer of Manchester, England, one of the cleverest of mechanical experimenters. Working with a voltaic pile, he concluded that heat generated by a current of electricity is proportional to the resistance and to the square of the current. By means of an ingenious device, he determined that the quantity of heat capable of increasing the temperature of 1 pound of water by 1°F. is equal to and can be converted into a mechanical force capable of raising 798 pounds to the perpendicular height of 1 foot.

Joule's experiments with heat soon bore fruit in that they provided the basis for the formulation of the principle of the conservation of energy, probably the most significant contribution to physics made during the nineteenth century. Physicists needed a basic principle on which to work. Consequently, in 1847, a German scientist, Hermann von Helmholtz (1821–1894), formulated what is known as the first law of thermodynamics. It teaches that the total of energy in the universe is constant. We cannot destroy energy, nor can we create it. We can produce energy only by changing it from one form into another. Helmholtz stated this principle in the following striking words: "We cannot create mechanical force, but we may help ourselves from the storehouses of nature. The brook and the wind which drive our mills and the forests and coal beds which supply our steam engines and warm our rooms bring to us but a small portion of the vast natural supplies available for our purposes."

The first principle did not solve completely the problem of thermodynamics. Those who worked with steam engines knew that no heat can be transferred without loss; energy must be added to maintain constant temperature. The second law of thermodynamics is based upon the view that the universe is constantly reducing the amount of available energy and will ultimately become cold and lifeless. This law, known as the principle of the dissipation of energy, was successfully stated for the first time in 1852 by William Thomson (1824–1907), or Lord Kelvin as he is better known.

William Thomson was professor of natural philosophy at the University of Glasgow. Appointed to this post when but twenty-two years of age, he at once made a name for himself. He was an excellent mathematician and physicist, particularly gifted in mechanical matters. He helped to make the Atlantic cable a success by inventing a sounding machine that enabled seamen to study the elevation of the floor of the ocean. He also developed the modern mariner's compass.

Chemistry, like physics, was soon to be placed upon a substantial foundation by the work of such men as Joseph Priestley (1733–1804). This Englishman and his contemporaries were the first to free chemistry from the befuddling phlogiston theory of combustion. Beginning inauspiciously with observations on the gas exhaled from beer vats, Priestley learned to duplicate this phenomenon in the laboratory and discovered carbon dioxide. Dissolved in water, this makes our common soda water. For some time, chemists had been using the "pneumatic trough," a water-filled vessel designed to catch gases and only partly efficient. Priestley hit on the idea of filling the trough with mercury. This enabled him to isolate gases previously uncollected, among which were ammonia, hydrogen chloride, and sulphur dioxide. Priestley further experimented with air and was one of the first to dissociate oxygen, hydrogen, and nitrogen.

Another Englishman, the brilliant and eccentric Henry Cavendish (1731–1810), discovered a basic fact about water—that it is composed of two gases, hydrogen and oxygen, in the proportion of two parts to one. While the significance of the experiments of Priestley and Cavendish was not realized until later, their discoveries were to provide the foundation for the work of later men on such chemical necessities as fertilizers, anesthetics, and munitions.

Antoine Lavoisier (1743–1794), another pioneer in the development of chemical science, laid down a series of principles as the basis of the new science of chemistry. Substances, he declared, can burn only when oxygen is present. Nonmetallic substances such as phosphorus, sulphur, or carbon produce phosphoric, sulphuric, or carbonic acid when burned

in the presence of oxygen. Metals burned in air produce a calx by uniting with oxygen, a process that makes the calx heavier than the original metal. There is no such thing as phlogiston; combustion is due to the union of the burning substance with the oxygen from the surrounding air. The phlogiston theory was now defunct, although ultraconservative scientists continued to believe in it in spite of the fact that the existence of phlogiston could never be demonstrated experimentally.

Although never a university teacher, Lavoisier taught chemistry to thousands. Even today his influence is felt, for his famous textbook *Elementary Treatise on Chemistry*, which appeared in 1789, contained the marrow of chemical science. In it, Lavoisier presented a totally new terminology, which is still used. He dropped such clumsy expressions as "phlogisticated air," "dephlogisticated air," and "inflammable air" and substituted simple terms like nitrogen, oxygen, and hydrogen. He gave exact meaning to such words as oxide, salt, sulphate, nitrate, nitrite, and a host of others. Unfortunately for the world of science, Lavoisier was cut off in his prime. Accused of disloyalty to the French Republic, he was sent to the guillotine, a victim of political passion.

Another step forward in chemical science was the development of the atomic theory. Ancient philosophers like Democritus had talked about atoms. They held that the universe was composed of a vast multitude of indivisible and indestructible particles. This theory was revived by John Dalton (1766–1844), whose significant achievement was the formulation of the atomic theory—that every element is composed of minute particles, or atoms, of different size and weight, indivisible and the same under all conditions. He drew imaginary pictures of atoms and even made models of them, balls 1 inch in diameter, which he used in demonstrating his theory to pupils. Dalton, of course, never saw any atoms, but his theory proved acceptable for practical purposes. Many years later, the French chemist Jean Perrin (1870–1926) by means of a powerful microscope came to the amazing conclusion that 1 cubic centimeter of gas contains over thirty-one septillion molecules. Molecules are combinations of atoms, but Dalton did not have the apparatus to ascertain this point.

Louis Joseph Proust (1754–1826), a French chemist working in Madrid, proved after years of research that when elements combine, forming chemical compounds, they always unite in definite proportions and according to weight. This law of definite proportions became a basic principle upon which modern chemical science rests. It implies that there is a general principle in matter which is uniform throughout the universe.

To determine the weight of particles so exceedingly minute, even if they could be seen, was impossible. But Dalton established a system of relative atomic weights. Although his theory has been modified and improved, a table based on Dalton's conception of atomic weights still is the cornerstone upon which chemical calculation rests. Hydrogen, being the lightest substance known, was taken as the standard by which other elements were to be weighed. Dalton mistakenly believed that in producing water 1 atom of hydrogen united with 1 of oxygen but that, so far as weight was concerned, they united in the proportion of 1 to 7. Therefore, he gave hydrogen the value of 1 and oxygen that of 7.

The atomic theory was not wholly satisfactory. There was so much confusion among chemists that the table of weights was far from perfect. Amadeo Avogadro (1776–1856), an Italian scientist at the University of Turin, advanced a theory to explain the discrepancies. He showed that gases are made up not of single atoms but of groups of atoms called molecules. The smallest particle of hydrogen gas, for example, is composed of a molecule of two atoms chemically joined. Avogadro's law stated that "equal volumes of all gases under the same conditions of temperature and pressure contain the same number of molecules." This theory was long disregarded and Avogadro's name was almost forgotten until one of his pupils, Stanislao Cannizzaro (1826–1910), championed his theories so convincingly that Avogadro's law has become a fixed doctrine in chemical theory.

At this time, there was great confusion in the use of chemical symbols, for chemists still employed the ancient symbols of alchemists. Each chemist created new symbols whenever it seemed wise to do so. The case of Dalton's pictures of different atoms illustrates this point. It was necessary to clarify symbols, just as Lavoisier had laid the foundations of a chemical vocabulary. This was accomplished by Jöns Jakob Berzelius (1779–1848), a Swedish professor at the University of Upsala. For carbon he wrote C, for nitrogen N, for hydrogen H, for oxygen O, for sulphur S, for phosphorus P, for gold (Latin, *aureum*) Au, for silver (Latin, *argentum*) Ag, for copper (Latin, *cuprum*) Cu, and so forth. To represent the simplest parts of compounds, he joined these symbols. Thus, CuO stood for copper oxide. He also employed algebraic exponents to indicate the number of atoms of each element. Later, these were changed to subscripts. Thus we designate water as H_2O, a substance in which two atoms of hydrogen are chemically joined to one of oxygen.

Chemists long believed that there was an impassable barrier between organic and inorganic compounds. Little work had been done in organic chemistry, which deals with substances created by organisms. Chemists had a theory that a vital element existed in bodies that created such organic compounds as fats, starches, proteins, and a multitude of others

of the greatest complexity. Friedrich Wöhler (1800–1882) actually produced the organic substance urea found in urine, by ordinary chemical processes, from inorganic compounds, and without the means of a kidney. The year before, in 1827, he had isolated aluminum. His friend Justus von Liebig (1803–1873), a professor at the University of Giessen, rendered even greater services to organic chemistry. His laboratory was the prototype of chemical laboratories, and students from many countries including the United States came to sit at his feet. He discovered chloroform but did not dream of the significance it was soon to have for the medical profession. He also tried to enrich the soil with chemical compounds and made a waste patch flourish like a fertile garden. Thus he proved that stable manure and green manure were not entirely necessary in the production of crops. Organic chemistry at the hands of Liebig prepared the way for new industries; artificial fertilizers soon came into use. The multitude of organic compounds that today may be produced in any properly equipped laboratory testifies to the energy and acumen of these two scientists.

Svante Arrhenius (1858–1927), a Swedish scholar at the University of Upsala, discovered the principles of electrolytic dissociation, or ionization, thereby laying the basis for a profound revolution in physical chemistry. At first he was opposed by his learned colleagues, but the brilliant Wilhelm Ostwald (1853–1932), a professor at the University of Leipzig, energetically supported him. Arrhenius's contentions were reinforced by the discoveries of Jacobus Van't Hoff (1852–1911), an eminent professor of chemistry at the University of Amsterdam. In electrolytic dissociation, molecules are dissociated into "ions," particles carrying positive or negative electrical charges. The infinitesimally small ions carry electric currents through the solutions; and as they touch, the electrodes yield their charges and return to their earlier atomic state. Ionization today is a basic chemical principle that possesses numerous applications in industrial chemistry.

The search for a complete list of the elements went forward. It was obvious that as long as some were undiscovered many secrets of chemical structure must remain unknown. Some scientists tried to arrange the elements in a series. Finally a Russian, Dmitri Mendelyeev (1834–1917), drew up a table of elements according to their atomic weight, showing that there was a certain repetition, or "periodicity," of similar properties. The table was broken by important gaps, however, and Mendelyeev boldly advanced the theory that elements with atomic weights and properties corresponding to the vacant places in the table of elements existed and would eventually be found. This theory was proved, in part at least, when in 1875 and in 1886 two of the hypothetical elements, which Mendelyeev called eka-aluminum and ekasilicon, were actually

discovered. These studies greatly stimulated chemical research; only two gaps (atomic numbers 85 and 87) remain to be filled. At the present time, we possess ninety-two elements, more than four times as many as were known to Lavoisier. Mendelyeev's periodic law gave scientists a complete and practical theory upon which to build a more sound edifice of chemical speculation.

At the close of the nineteenth century marvelous progress had been made in exploring the secrets of the physical universe. Facts and principles never before dreamed of had been discovered. It appeared that little more remained to be investigated; the end of the development of science seemed at hand. Yet the scientific world was at the threshold of a revolution. The phenomena of radioactivity were about to be discovered. In the space of one brief generation, this discovery overturned accepted ideas about matter that scientists in 1893 confidently believed were as fixed and final as the propositions of mathematics.

Sir William Crookes (1832–1919), an English scientist, investigated the passage of currents of electricity through tubes from which most of the air had been removed. He invented the famous "Crookes tubes." The current of electricity that passed from the electrode to the opposite end of the tube presented strange phenomena that no physicist had observed. The rays warmed objects and turned small paddle wheels placed in their path. Certain objects placed in the path of the rays glowed with a phosphorescent light. These facts were duly published, and scientists began investigating with Crookes tubes. Professor Wilhelm Roentgen (1845–1923), a physicist at the University of Würzburg, found by accident that a screen covered with a phosphorescent substance and standing near the tube began to glow. He had covered the tube with black cloth, but it was evident that rays invisible to the eye had penetrated the cloth. After extended experimentation, he found that the rays had the power to pass through many solid substances and were able to photograph objects in purses and bones in the human body. Scientists everywhere began to experiment with these strange rays, called Roentgen or, more commonly, X rays. The Crookes tube was improved, and a new one, the X-ray tube, invented.

Professor Antoine Henri Becquerel (1852–1908) of the University of Paris had noted that several substances became phosphorescent when exposed to sunlight. Could there be any relation between this fact and the recently discovered X rays? He wrapped a photographic plate in black paper, put a metal cross on it, and after exposing salts of uranium to the sunlight placed the salts upon the cross. The developed plate showed the outlines of a cross. He repeated the experiment but, as there was no sunlight, put the plate with black paper, cross, and salts of uranium in a drawer and for a time forgot it. Some weeks later,

he remembered his half-finished experiment and wondered whether the salts of uranium that had not been exposed to sunlight might have had any effect upon the plate. When developed, the plate showed the outlines of a cross. Clearly, salts of uranium emitted rays independently of sunlight. This discovery made in 1896 stimulated the curiosity of Mme Curie, who proposed to ascertain whether any other substances emitted rays.

Madame Curie, or Marie Sklodowska (*d.* 1937) as she was known before her marriage to Pierre Curie, was of Polish birth but did her research in Paris. The year after her marriage to Pierre Curie, an able scientist, she began working upon problems suggested by Becquerel's researches. She discovered that salts of thorium possess radioactive features similar to those of uranium and noted that pitchblende ore from which uranium has been extracted contains a substance which emits rays four times as strong as those of uranium. Husband and wife determined to find the mysterious element. A ton of pitchblende ore was brought from Bohemia. With incredible labor, they reduced this vast bulk to a few pounds. Early in the process, in 1898, they announced the discovery of a new element, polonium, so named to satisfy a patriotic sentiment of Mme Curie. Finally, in 1900, after the death of her husband she announced the discovery of radium, a substance present in the richest grade of pitchblende in the proportion of 1 to 7,000,000,000. Thus was found the element that has upset many theories in physics and chemistry and revolutionized medicine and surgery.

Meanwhile, a serious attack was launched against the atomic theory. Since the days of John Dalton, it had been held that atoms constituted the smallest possible division of matter. In his quaint Quaker manner, he used to say, "Thou knowest thou canst not divide an atom." Sir Joseph John Thomson (*d.* 1940), a professor of physics and director of the Cavendish Laboratory at the University of Cambridge, developed evidence that the time-honored theory of the indivisibility of atoms needed revision. He was much impressed by the earlier discoveries of the Curies but based his own researches upon the Crookes tube. In 1897, he declared that the stream of rays is composed of particles much smaller than the tiniest atom known and that these particles, which came to be called "electrons," are negatively charged. Moreover, they possess weight and travel with a velocity of 160,000 miles per second. Sir Ernest Rutherford (*d.* 1937), one of Thomson's pupils and a professor of physics at McGill University, in studying rays emitted by radium, isolated the so-called "alpha particles" carrying positive charges. He believed that an atom consists of a nucleus carrying positive electricity and a surrounding mass composed of planetary electrons carrying negative charges. These particles, much heavier than electrons and traveling at a rate of only 20,000 miles per second, became known as "protons."

Another profound change in the theory of matter was effected by the researches of Henry Moseley (1887–1915), an English genius who had been introduced to the subject of radioactivity by Rutherford. Studying each chemical element by means of X rays and spectroscope, he bombarded each of the elements with a stream of electrons and produced X rays. He watched their behavior through a spectroscope and measured their wave lengths; the square roots of the wave lengths of these different elements formed a perfect series. Hydrogen was 1, helium 2, and uranium, the last element, 92. He rearranged the table of elements, placing them in orderly succession and giving each element its proper atomic number in the scale. All this was accomplished by Moseley in 1913, before his twenty-sixth birthday. In August, 1915, he lost his life in the First World War.

Students in many countries have continued the search for information about the structure of the atom. It was discovered that the atomic numbers assigned to the elements by Moseley indicate the number of electrons in each atom. Thus carbon with 6 as its atomic number possesses 6 electrons and 6 positively charged protons. Radium with 88 as its atomic number has 88 electrons and 88 positively charged protons. In addition, the "neutron," a particle that moves with great velocity but is not charged with electricity, was discovered. It appears to be one of the elements of an atom, in addition to the electron and proton. Rutherford, examining alpha rays with the aid of a spectroscope, discovered that they are ions of helium. This was an astounding discovery. For generations, scientists had pooh-poohed the transmutation pretensions of alchemists. Now a scientist had shown that nature in her own great laboratory apparently was turning one element into another! Further study is being made of the structure of the atom. What the future will reveal we cannot guess, but it is probable that revolutionary conceptions of matter are in the making.

Mathematics and the Natural Sciences. Our conceptions about space and its contents have always been geometrical, that is, Euclidean. We think of space as being determined by lines that give length, width, and depth. In such a world, space, matter, time, motion, and like phenomena are regarded as absolute. Their mathematical relationships can be stated in logical and precise formulas. Ever since the days of Newton, these formulas have been regarded as absolutely accurate in every part of the universe. Yet scientists repeatedly encountered phenomena that did not quite fit the scheme of Newtonian physics. For example, the passage of the planet Mercury in its orbit around the sun does not obey the laws of Kepler and Newton with mathematical exactitude. The Euclidean and Newtonian conception of the universe with its absolute concepts of time, space, matter, and motion began to seem impossible to uphold in every respect.

Albert Einstein, born in 1879 of German Jewish parentage, early showed the keenest interest in mathematics and scientific questions. His "theory of relativity," fully developed by 1915, attracted much attention in spite of the fact that the nations of Europe were plunged in the First World War. The theory is impossible for any but expert mathematicians to grasp; hence, it is more talked about than understood, though it is remarkable how the average nonscientific man's imagination has been captivated by it. Einstein himself stated, "I can tell you in one sentence what it [the theory of relativity] is about. It concerns the connection or relation between electricity and gravitation. It is a purely mathematical theory and therefore inexplicable to a layman."

Physicists had demonstrated that the unit of electricity is the electron and that a stream of electrons produces an electric current. They had shown that minute electronic particles constitute the basic units of matter and that vibrations of negatively charged electrons around positively charged protons give rise to the phenomenon of light. Matter is affected by gravitation, and so Einstein argued that light, being derived like matter from electrons, is influenced by gravitation. Soon after Einstein had set forth his views, his arguments based upon mathematical calculations were shown by experiment and observation to be correct. Hence, light does not travel in straight lines but is bent by gravitational forces; thus the straight lines of the universe are bent lines. Mathematical equations and physical formulas evolved by scientists are not absolute, not true everywhere under all conditions. Therefore, formulas purporting to set forth laws of nature are only relatively correct. Newtonian conceptions of the universe, however, are sufficiently accurate to be valid for us living on the earth.

Since mathematics is one of the bases of physical things, it follows that the history of mathematics is an important part of the development of the natural sciences. This subject, unfortunately, requires much specialized study before one can understand or comprehend its implications. One of the most remarkable facts in the history of modern science is the devotion to mathematics shown by the Bernoulli family. This Belgian family migrated to Switzerland, established itself in Basel, and became prominent in mathematical study, a number of its members, especially Jakob Bernoulli (1654–1705) and his brother Johann Bernoulli (1667–1748), being associated with the University of Basel. Progress in mathematical research now became rapid. Leonard Euler (1707–1783), a Swiss and a pupil of the Bernoulli family; Joseph Lagrange (1736–1813), an Italian of French descent; Pierre Simon de Laplace (1749–1827), a Frenchman who developed the nebular hypothesis; Adrian Legendre (1752–1833), a Frenchman who rearranged the propositions of Euclid and so modernized the study of geometry; and Karl

Gauss (1777–1855), a German who became famous for his theory of numbers—all deserve credit in marking out the foundations upon which the present-day specialization in mathematical study is based. There have been many notable mathematicians during the past hundred years, but most of them were specialists whose contributions require long study to be understood.

As, from the eminence of present-day scientific achievement, we survey the progress of accurate knowledge about the physical world, we are struck with its revolutionary character. Science is a natural product of man's intellectual prowess. Most peoples, even the most ancient, developed some acquaintance with physical nature. Heirs of the Egyptians and Babylonians, the Greeks made special advances, experimental as well as observational. Their successors, the Arabs and scholastic philosophers, continued their labors, laying the foundations of early modern science. All beginnings must needs be slow, and experimental science was no exception to this rule. Unsurpassed in metaphysical study, the Scholastics and their modern successors failed to appreciate the need of prolonged experimentation under laboratory conditions. This was precisely what modern natural science accomplished—the accumulation of a vast body of accurate learning about the physical world. For the first time in history, mankind possessed a knowledge of nature and methods of investigation on a scale sufficient to expand human activity at a fantastic rate.

FOR FURTHER READING

Agassiz, E. C.: *Louis Agassiz. His Life and Correspondence*
Bell, E. T.: *Men of Mathematics*
Bell, Louis: *The Telescope*
Berry, Arthur: *A Short History of Astronomy*
Bryant, W. W.: *A History of Astronomy*
Cajori, Florian: *A History of Mathematics*
———: *A History of Physics*
Curie, Eve: *Madame Curie. A Biography*
Dampier-Whetham, W. C.: *A History of Science*
Einstein, Albert, and Leopold Infeld: *The Evolution of Physics*
Geikie, Archibald: *The Founders of Geology*
Ginzberg, Benjamin: *The Adventure of Science*
Hart, I. B.: *Makers of Science. Mathematics, Physics, Astronomy*
Jaffe, Bernard: *Crucibles. The Great Chemists*
Lenard, Philipp: *Great Men of Science*
Libby, Walter: *An Introduction to the History of Science*
Macpherson, Hector: *Makers of Astronomy*
Magie, W. F. (ed.): *A Source Book in Physics*
Merz, J. T.: *A History of European Thought in the Nineteenth Century*
Moore, F. J.: *A History of Chemistry*, 2d ed.
Morton, E. J. C.: *Heroes of Science. Astronomy*
Murray, R. H.: *Science and Scientists in the Nineteenth Century*

Chapter XLVIII

DEVELOPMENT OF BIOLOGICAL SCIENCE

In science, as in all other departments of inquiry, no thorough grasp of a subject can be gained unless the history of its development is clearly appreciated.—Archibald Geikie

THE science of biology, like the physical sciences, was completely revolutionized after 1700. From the days of Columbus and his fellow explorers, knowledge of the world expanded greatly. Men became acquainted with new continents, new peoples, new plants, and new animals. Theophrastus, the Greek scientist, was acquainted with only about five hundred plants. Medieval herbalists, who were interested in plants chiefly from a medicinal standpoint, knew but two thousand. By 1600, this number had risen to ten thousand. Knowledge of animals was similarly increased. These new findings on plants and animals and the conditions under which they flourished excited the curiosity of scholars and stimulated biological study.

Nevertheless, the beginnings of biological study were difficult; one of the most perplexing problems was to determine how to start. For centuries, in fact ever since Aristotle, men had noticed that plants and animals can be divided into groups. They spoke of such groups as *genera* (singular, *genus*). They also noted that there is a variety of plants and animals in each genus. Such a variety is called a *species*. Thus the genus "horse" comprises a number of species such as the ass, the zebra, and the common horse. But students noticed that within each species there are almost imperceptible gradations which often only the most painstaking study reveals. The same is true of genera. A neat catalogue of genera and species therefore is impossible to draw up. The simple division into genera and species nevertheless was a necessary starting point for students of botany and zoology, the two branches of biology.

Linnaeus. The eighteenth century witnessed noteworthy progress in both botany and zoology. Carolus Linnaeus (1707–1778), a Swedish scholar who studied at Lund and Upsala, became interested in medicine and botany. Winning the interest of his professors, he was given some money to go to Lapland for botanical study. This expedition stimulated his scientific interest, for he noted strange animals and became acquainted with more than one hundred new species of plants. Linnaeus next went to the Netherlands, at that time the center of the most advanced

scientific study, where he studied at Leiden under the great medical authority Hermann Boerhaave. He was appointed private physician to the burgomaster of Amsterdam who was deeply interested in botanical gardens, which afforded Linnaeus further opportunity for study. Before he left the Netherlands, Linnaeus published two notable books, the *Systema naturae*, or *System of Nature*, and the *Classes plantarum*, or *Classes of Plants*. Soon after his return to Sweden, he secured a post at the University of Upsala as professor of natural history and occupied this position until his death.

According to Linnaeus, species were fixed. Each species had issued from the hand of God, as he had created and endowed it, with special characteristics, a view generally held at that time because it seemed to conform to the teachings of the Book of Genesis. Although St. Augustine of Hippo believed that species evolved, most medieval thinkers declared that they had been created. This traditional view was upheld by Protestant theologians, who, since they emphasized the Bible rather than the church as the source of authority, followed the letter of the law according to the first chapters of Genesis. Linnaeus inherited this conception and, at least during his early years, insisted that after the act of creation had been completed no new species had appeared. But his observations taught him that, instead of being fixed, species underwent apparent changes. Therefore, in 1762 he modified his viewpoint, stating that "all the species of one genus constituted in the beginning formed one species; . . . afterward they multiplied by hybrid generation, in other words, by intercrossing with other species." Linnaeus therefore believed that new species had come into existence since Creation and that they had degenerated from their original types. He further declared that climate, or environment, had assisted in the process of degeneration. The last editions of the *Systema naturae* contain this modified point of view. It should be noted that Linnaeus did not concern himself with plant and animal physiology, which today is of the utmost importance in biological study. In classifying plants and animals, he popularized the idea, employed by earlier naturalists, of using one name to designate the genus and a second to indicate the species. This "binary nomenclature" was used in his *Classes plantarum* of 1753, which listed about 7,300 species. Many of these are still known by the name Linnaeus gave them. Subsequently, it became customary to affix the name or an abbreviation of it of the naturalist who first named the plant or animal. All those described by Linnaeus are so indicated, as, for example, *Homo sapiens, Linn.*

Study of Insects: Réaumur. René de Réaumur (1683–1757), a Frenchman, an older contemporary of Linnaeus, devoted much attention to the study of insects. He was a scientist of great attainments, which

unfortunately have never been sufficiently recognized. He made numerous scientific discoveries and invented the Réaumur thermometer still widely used. Réaumur was a man of encyclopedic knowledge; his contemporaries named him "the Pliny of the eighteenth century." He described with great accuracy the appearance and habits of insects and published his findings in six volumes between the years 1734 and 1742. He also left a manuscript, not published until 1926, the *Natural History of Ants*. This work is of great importance for the biology of insects.

The Theory of Evolution: Buffon and Lamarck. The theory of biological evolution—today generally accepted—began to gain adherents at this time. Instead of believing that species and genera are fixed forms, modern biologists hold that in some way existing forms have evolved from previous forms. It is believed that species and genera, even the most divergent, have a common ancestry. Within one century after Linnaeus's death the evolutionary theory gained ascendancy. Georges Louis de Buffon (1707–1788), the first to make substantial progress in this direction, was born of noble parents in Burgundy. In 1739, he was named keeper of the king's gardens in Paris (the Jardin du Roi, after the French Revolution called the Jardin des Plantes). The Jardin du Roi thenceforth became the center of biological study. Buffon was a brilliant master of French prose; few scientists have been so skillful in setting forth difficult scientific ideas. He enlisted the services of a skilled anatomist named Louis Daubenton (1716–1800), and together they projected and published the famous *Histoire naturelle* in fifteen volumes. Deeply influenced by Newton, Buffon learned that all parts of the physical universe are interrelated, being governed by a number of laws. He began to look upon the biological world as similarly closely interrelated. At first he believed in the fixed character of species but, as his studies progressed, became less certain on this point. He noted the close relationship between climate and the geographical distribution of plants and animals. Influenced by natural conditions, species were no longer what they once were thought to be. He noted that some animals had parts they no longer used, for example, toes. Species had degenerated; he believed that the ass was a degenerate horse and the monkey a degenerate man. Buffon was far from arriving at a systematic doctrine of evolutionary biology, but he did ask questions that only advocates of the evolutionary theory have been able to answer.

The real founder of evolutionary biology, however, is Lamarck (1744–1829), born of a family belonging to the lesser nobility. While serving in the army at Monaco on the Mediterranean, he became acquainted with the plants peculiar to southern France. He attracted Buffon's

attention when writing the *Flore française*, or *Flora of France*. During the French Revolution, Lamarck became a professor of zoology at the Jardin des Plantes. Although he had devoted little time to zoology, he addressed himself to his new study with such vigor that he became the greatest zoologist of his day. Lamarck published his *Philosophie zoologique*, or *Philosophy of Zoology*, in 1809 and *Natural History of Invertebrates* from 1815 to 1822 and invented the word "biology" to denote such study.

According to Lamarck, no hard and fast distinction can be made between species. He argued from the way domesticated animals are bred that species are not fixed. The dog, he declared, is the common ancestor of such diverse forms as the bulldog, spaniel, greyhound, and shepherd dog. Although such variations have been produced by the skill of man, they also appear among undomesticated plants and animals. It was difficult to explain how such variations come about, but Lamarck had a fruitful theory. Environment changes constantly, and such changes modify the organs of plants and animals. Some organs are used more than others and so develop more extensively, while others are used less and decline. This is Lamarck's famous "law of use and disuse." Further, these modifications are in some way transmitted to the next generation—the doctrine of "transmission of acquired characteristics," which aroused the most heated controversy.

Comparative Anatomy: Cuvier. Georges Cuvier (1769–1832), an original and influential scientist who became a professor of comparative anatomy at the Jardin des Plantes, was a determined opponent of Lamarck's evolutionary ideas. His originality as a zoologist consists in the fact that he based his study upon comparative anatomy, a subject already developed by the physician John Hunter of London but now applied for the first time to the zoological world. This was a significant departure, for a sound theory of the relationships of the members of the animal kingdom could be established only upon a thorough knowledge of anatomical structure. Cuvier divided the animal world into four types and showed that each creature was anatomically modeled after one of them. This type theory was a great advance upon Linnaeus's simple classification based upon a few external characteristics only. In 1817, Cuvier published his mature views in his classic *The Animal Kingdom*.

In studying types, Cuvier was led to the investigation of fossils. To him, paleontology was geological zoology. His *Researches on Fossil Bones*, published in 1812, made earlier geological speculations obsolete. It dealt with the fossils of the Cenozoic Age and showed that extinct species were related in type to others still living. He believed, in common with geologists of the day, that many species had become

extinct because of catastrophic upheavals, the last being the Flood told of in Genesis.

Cuvier's *Researches on Fossil Bones* is probably the most significant work in the whole literature of comparative anatomy and paleontology. Rejecting the theory of evolution and the ideas of Lamarck, Cuvier's followers referred to them as "follies." However, evolutionists like Darwin were to make effective use of Cuvier's researches on fossils and base their arguments in favor of an evolutionary development in the plant and animal world upon paleontological evidence.

Beginnings of Embryology: Baer. Embryology, the study of the embryo from the unfertilized egg until birth, developed after 1800. Little progress had been made in studying the prenatal history of animals. Hippocrates had held that the life history of animals began with the egg, but during the eighteenth century an amazing theory called "preformation" was widely accepted. The human spermatozoon was assumed to contain a microscopic human being. Students even asserted they had seen its hands and feet, fingers and toes. This theory, presumed without observation, for some time kept scientists from studying embryos carefully. Adherents of the preformation theory, called "animalculists," quarreled with the "ovists," who believed life started with the egg.

Karl von Baer (1792–1876) was the real founder of embryology. Born in Estonia of German parentage, he spent many years as a professor of science at the University of St. Petersburg. In his first great work, *On the Origin of the Egg of Mammals*, which appeared in 1827, he showed that the egg originates in the ovary and indicated some of the stages through which the embryo passes. His second book, *On the History of the Development of Animals*, revealed facts about the changes through which the embryo passes from the moment the egg is fertilized, much of his information being derived from a study of the development of the embryo in hens' eggs. He showed conclusively that an evolutionary tendency exists throughout the life of embryos. This work, of immense importance because it threw a clear light upon comparative anatomy and physiology, was one of the bases on which scientists founded their arguments for the theory of evolution. But as the microscopic cell construction of physical organisms still was unknown, Baer's knowledge of the evolution of the fertilized egg remained incomplete.

Cytology and Plant Physiology. The improved microscope revolutionized conceptions of biological science. The famous Italian microscopist Marcello Malpighi noted that wood was composed of a vast number of microscopic cells. Another scientist, the Englishman Nehemiah Grew (1641–1712), likewise studied plants microscopically and drew many beautiful sketches of cross sections. But neither Malpighi

nor Grew advanced very far toward discovering the true nature of cells. It was left to the Scottish botanist Robert Brown (1773–1858) to lay the foundations of cytology, the study of cellular structures. He had remarkable opportunities to study the little known flora of Australia, New Zealand, and adjacent lands. The expeditions of James Cook, described in the following chapter, had greatly advanced the study of botany. The naturalist Joseph Banks (1743–1820), who accompanied Cook on his expedition, befriended Brown and gave him complete freedom to study his collection of plants. Later, Brown himself went to Australia and collected 4,000 plants. The collections made by Banks and Brown form the basis of the present botanical display of the British Museum. But Robert Brown's reputation rests mainly upon his discovery that the cell is a complex structure composed of a nucleus and fluid contained in an envelope.

The next step forward was the discovery that animal tissues, like those of plants, are composed of cells each possessing a nucleus. Matthias Schleiden (1804–1881), a botanist at the University of Jena, carried Brown's cell theory to greater perfection and showed that cells are the basis of all plant life. Then Theodor Schwann (1810–1882) made the epochal discovery that this is also applicable to the animal world. Schwann declared that "the principle of evolution is based upon the formation of cells," but he failed to understand the true structure of cells. He knew about the cell wall and the nucleus, but the rest of the contents he vaguely referred to as "slime." Hugo von Mohl (1815–1872), a professor of botany at the University of Tübingen, called the cell substance "protoplasm," thus establishing the cell theory in a definitive manner. Thereupon Rudolf Virchow (1821–1902), an eminent professor at the University of Berlin, coined the phrase *omnis cellula e cellula*, "every cell springs from a previously existing cell." The cell theory enabled Virchow to develop a new pathology based upon the functioning of cells.

It is curious that plant physiology by this time had made greater progress than other branches of biology. Stephen Hales (*d.* 1761), an Englishman, had measured the force of sap in plants. Jan Ingenhousz (*d.* 1799), a Netherlander, found that plants exhale oxygen and derive carbon from carbonic acid gas in the air. By this time also, the nature of plant sexuality had become known through Camerarius (*d.* 1721), a professor of botany at the University of Tübingen. The study of cross-fertilization and the production of hybrids thereupon became popular.

Evolution: Darwin. Of all these triumphs of biological study none equaled the discoveries of Charles Darwin (1809–1882). Born in Shrewsbury, England, Darwin studied mathematics and the Greek and Latin classics but showed little aptitude for these subjects. Interested

in nature, he spent his time collecting specimens of marine animals—which did not help him at school—and his teachers thought he was below the average in ability. "You will be a disgrace to yourself and all your family," his father declared. The boy was thereupon sent to study medicine in Edinburgh, but anatomy nauseated him. Next he was sent to Cambridge to study theology, but that, too, failed to interest him. He persisted in studying beetles, collecting specimens, and observing animals. One of the professors, a naturalist, appreciated his latent ability and recommended he be appointed to an unsalaried post as naturalist on the ship *Beagle*, which the British government was preparing for an expedition, for the purpose of making a survey of Patagonia and Tierra del Fuego, mapping the shores of Chile and Peru, visiting the islands in the Pacific, and carrying certain meteorological instruments around the world. This was a splendid opportunity for a budding naturalist. The voyage began in December, 1831, and came to a close when the *Beagle* docked at Falmouth in October, 1836.

Darwin's scientific observations made on the *Beagle* were published in 1840 in his *Journal of Researches into the Geology and Natural History of the Various Countries Visited during the Voyage of H.M.S. Beagle around the World*. This is one of the world's great books and illustrates the zeal that naturalists of the time brought to the study of the strange flora and fauna of distant parts and the novel conditions under which these lived. Darwin had a keen eye for detecting the unusual; even his notes about the inhabitants of such backward regions as Tierra del Fuego have been of scientific value to anthropologists.

In 1842, Darwin moved to the quiet village of Down in Kent, where he studied his notes, read scientific literature, and pondered on the problem of species and their changes. His ideas began to take shape after reading Thomas Malthus's *Essay on the Principle of Population* (1838). Malthus argued that, as populations increase geometrically and the food supply increases only arithmetically, the time would come when populations would be checked by sheer want. Darwin applied this theory of struggle to biology. "Being prepared to appreciate the struggle for existence which goes on everywhere," he wrote, "it struck me that favorable variations would tend to be preserved, unfavorable to be destroyed. The result would be the formation of new species."

Meanwhile, another naturalist, Alfred Russel Wallace (1823–1913), was evolving similar ideas. Wallace made an extended visit to Brazil and spent many years in the Dutch East Indies. Probably no other man possessed so vast a store of zoological knowledge. He read Malthus's work while staying on the island of Ternate and arrived at the same conclusions as Darwin. He drew up a brief essay explaining his views and sent it to Darwin for suggestions. Much impressed, the latter

presented the paper, together with a statement of his own, before the Linnaean Society of London.

Darwin now hastened the composition of his great book, *The Origin of Species by Means of Natural Selection*, which appeared in 1859. At once it was hailed as a significant contribution and became a scientific classic. The theory of evolution was placed upon a firm basis; every step was buttressed by specific examples difficult to refute. In 1871 Darwin published *The Descent of Man and Selection in Relation to Sex*, in which he determined man's place in the animal world and his evolutionary connection with it.

These ideas on evolution provoked spirited discussion, and many scientists opposed him. But there were vigorous champions such as Thomas Huxley (1825–1895) who, as a teacher of science in the London School of Mines, extended his studies to paleontology, physiology, and comparative anatomy. When *The Origin of Species* appeared, Huxley immediately supported the new evolutionary theory. Although an excellent scientist, he undoubtedly was far more successful as a critic and popularizer of the new theories. His *Collected Essays* greatly stimulated interest in general scientific topics.

Studies in Heredity. The concepts of evolution, natural selection, survival of the fittest, and transmission of acquired characteristics greatly modified old ways of viewing life. The question of heredity claimed the attention of Francis Galton (1822–1911), a cousin of Darwin, who in 1869 published his *Hereditary Genius: An Inquiry into Its Laws and Consequences*. Galton's fame rests upon the science of eugenics, a subject that he founded. He collected a vast amount of curious data related to heredity that sometimes led him to ridiculous extremes. He insisted that characteristics such as stature, color of skin, muscular strength, will power, genius, and even morality are inherited. If this is true it ought to be possible to breed a better race, eliminate the unfit, and solve the problems of society by selective breeding. Eugenics still is a young science, and it is uncertain whether its principles can be applicable to society as a whole. The present theories of racial purification adopted in some countries are an unfortunate misapplication of such ideas.

Mendelism, the Mutation Theory, and Weismannism. Gregor Mendel (1822–1884), an Austrian, developed a rigidly scientific method of studying heredity. While a monk at the Augustinian monastery at Brunn in Bohemia, he studied at the University of Vienna and carried on experiments with garden peas. He selected plants that differed in only one or two clearly divergent characteristics, such as red and white flowers, and crossed them. The hybrids of the first generation all had red flowers while those of the second generation varied in a definite

proportion; three-fourths produced red flowers and one-fourth white. In the third generation the plants with white blossoms, if they fertilized themselves, produced white flowers. One-third of the red also remained constant, but the remaining red plants presented a ratio of 3 red to 1 of white. These proportions recurred over and over whether plants were bred for color, size, or shape. Therefore Mendel declared the red strain to be "dominant" and white "recessive."

The Mendelian theory of inheritance, commonly referred to as Mendelism, made little impression until 1900, when Hugo De Vries (1848–1935) of the University of Amsterdam resurrected Mendel's writings from among the papers of the obscure scientific society of Brunn. De Vries was himself a noted botanist who had studied variations in evening primroses. He was struck by the fact that very divergent forms appeared, besides others that closely resembled the parent plants. He explained these new species as arising from "mutations." The theory of mutations has subsequently been shown by experimentation to be valid.

Mendelism and the mutation theory shook the confidence of Darwin's followers, who had readily accepted the master's principle of evolution by means of natural selection. But a more serious attack upon Darwin's theory was made by August Weismann (1834–1914), a professor at the University of Freiburg. He conceived of life as a continuous stream composed of germ plasm. Sex cells, made up of such germ plasm, form individuals of species which are composed of body cells and destined to die. Body cells do not influence the germ plasm of sex cells, nor can the characteristics acquired by the body cells be transmitted through sex cells. Hence, the basic dogma of Lamarck and Darwin was held to be false. Weismann succeeded in showing that the question of heredity is an extremely complex and mysterious phenomenon. The net result of Mendelism, Weismannism, and the mutation theory was to destroy complacent acceptance of the doctrine of the inheritance of acquired characteristics. That is, biologists were unable to show how evolution took place although they could demonstrate to their own satisfaction from geological and other evidence that it was a fact.

THEORY OF THE GENE: MORGAN. The labors of Mendel, De Vries, and Weismann stimulated careful study and painstaking experiment that produced much new information. For years, a number of biologists, led by Thomas Morgan (*d.* 1945), have gathered additional data, out of which the "gene theory" has been evolved. A gene may be defined as a differential substance in a cell that determines a specific peculiarity. Characters, that is, such features as color, stature, size, sex, and proportions, are caused by changes in the number of genes.[1]

[1] For further information on this subject the student is referred to H. H. Newman (ed.) *The Nature of the World and of Man*, Chaps. XIII–XV.

Rise of Bacteriology: Pasteur. Bacteriology, an important branch of biological study, deals with the swarming subvisible life that can be revealed only by means of the microscope. Its origins date from the beginnings of microscopy in the days of Anton van Leeuwenhoek, John Swammerdam, and Marcello Malpighi; but little progress was made until after the perfection of the microscope about 1830. Microbes were ignored by great biologists like Buffon, who thought that they were too small to be significant. The discoveries of Louis Pasteur (1822–1895) shook such ill-founded views. Pasteur, born in Burgundy, studied science with the utmost devotion and became a capable chemist. As a professor at the University of Lille, he broadened his interest in chemistry to include the absorbing study of microbes. This digression was to prove a boon to the beet-sugar industry of the surrounding area. Distillers were having trouble extracting alcohol from the beets—the pulp frequently spoiled. Called upon for help, Pasteur made a microscopic examination of the spoiled mash and discovered that it swarmed with strange growths rather than good yeast globules. By laboratory demonstration, he showed how to control these harmful growths and prevent the pulp from spoiling.

This success, however, left unanswered the question: "Where do microbes come from?" Many scientists insisted on a spontaneous generation, in spite of the fact that that theory had been disproved by Swammerdam. Obviously, before the relation of yeast and bacteria to such things as sugar-beet pulp and grape mash could be determined, an answer to the foregoing question must be found. Pasteur succeeded in proving what Swammerdam had demonstrated two hundred years before. Today the doctrine of biogenesis, that life can come only from life, is an accepted principle in biological science.

Pasteur went to Burgundy to investigate why wine turned bad after fermentation. He showed that this too was caused by microbic growths which could be killed by heating the wine after fermentation had ceased, the first application of a method which has since become famous as "pasteurization." Pasteur's investigation in the realm of microbes and their control proved of immediate practical value. In quick succession, he developed a control for silkworms that saved the silk industry and made a serum that prevented chicken cholera. Pasteur also studied hydrophobia, at that time a dread disease which struck terror into the hearts of all. He prepared a vaccine from the pulverized dried spinal cord of animals that successfully conferred immunity, provided that injections were made soon after infection. So widespread was Pasteur's fame that nineteen Russian peasants, bitten by a dog afflicted by rabies, came all the way from Smolensk to Paris for treatment. All recovered but three, who received treatment too late. As a tribute, admiring

friends in 1888 opened the Pasteur Institute, dedicated to the fight against infectious diseases.

Koch. Remarkable as were Pasteur's discoveries in bacteriology, it was Robert Koch (1843–1910), a German, who really put biological science on a scientific basis. Koch was one of the first to show that microbes cause death in animals and human beings, a discovery that made it possible for Pasteur to conquer hydrophobia. Koch, trained as a physician, approached the problem of infection from a medical point of view. He practiced in a small country community where the peasants were suffering huge cattle losses from anthrax. With his microscope he methodically searched for the cause and finally isolated the murderous germ. Studying the life history of the germ, he discovered that part of its career was spent in the form of a spore which infected browsing sheep.

The study of microbic organisms is a difficult one. At first, disastrous mistakes and ridiculous assertions were made. Some research workers believed they had discovered a microbe responsible for all infectious diseases. To avoid such errors, Koch developed a rigorously scientific method, referred to as "Koch's postulates," that still forms the basis of bacteriological research. There are four points in Koch's method, as follows: (1) A specific microbe must be shown to be present. (2) This microbe must be isolated from the diseased body and developed in pure culture. (3) When a pure culture is injected into an animal free of the disease, it must reproduce the disease. (4) The microbe must be recovered from the animal experimented upon. This method provides a check upon the accuracy of its findings.

Filterable Viruses. Bacteriologists in recent years have discovered that there is a realm of organisms, called filterable viruses, too small to be seen under the most powerful microscope. There is much speculation about their nature, for knowledge of these minute forms may shed light upon the nature of life generally. That such forms exist was demonstrated as far back as 1892, when the juices of infected plants, strained through the finest filters, were found still to be capable of infecting other plants. Such filterable viruses are believed to be responsible for smallpox, measles, hydrophobia, meningitis, sleeping sickness, and the foot-and-mouth disease among cattle.

While the development of the physical sciences described in the preceding chapter was of the utmost importance in the history of culture, the new study of biology was at least as revolutionary. The labors of Cuvier, Lamarck, and Darwin paved the way for modern conceptions of man's place in the world of living things. It was shown that, on the physical side at least, man biologically resembled other living forms, and the theory of evolution became a universally popular conception.

Newton in the eighteenth century revolutionized conceptions of our physical environment. Darwin in the nineteenth showed that human life was something not wholly isolated from other biological forms but related to them on an evolutionary basis. Unfortunately, as we shall learn, the theory of evolution was uncritically adopted in other branches of thought, as in the evolutionary philosophy of Herbert Spencer. A philosophy of life must have a broader basis than is offered by the principles that govern the physical or biological sciences.

FOR FURTHER READING

DAMPIER WHETHAM, WILLIAM: *A History of Science*
DEKRUIF, PAUL: *Microbe Hunters*
GREEN, J. R.: *A History of Botany*, 1860–1900
HOBSON, E. W.: *The Domain of Natural Science*
HUXLEY, LEONARD: *Charles Darwin*
JUDD, J. W.: *The Coming of Evolution*
KOPELOFF, NICHOLAS: *Man versus Microbes*
LOCY, W. A.: *The Growth of Biology*
MURRAY, R. H.: *Science and Scientists in the Nineteenth Century*
NORDENSKIOLD, ERIK: *The History of Biology*
OSBORN, H. F.: *From the Greeks to Darwin*
PACKARD, A. S.: *Lamarck, His Life and Work*
PEATTIE, D. C.: *Green Laurels: The Lives and Achievements of the Great Naturalists*
RADL, EMANUEL: *The History of Biological Theories*
ROUTLEDGE, ROBERT: *A Popular History of Science*
SACHS, JULIUS VON: *History of Botany*, 1530–1860
SINGER, CHARLES: *A Short History of Biology*
WARD, HENSHAW: *Charles Darwin, The Man and His Warfare*
ZITTEL, K. A. VON: *History of Geology and Palaeontology*

Chapter XLIX

GROWTH OF SOCIAL STUDIES

History is the memory of mankind; it far outruns the narrow range of our own personal recollections and enables us to participate consciously in a process of change so impressive in its vast length and complexity as to reduce the experiences of our own generation to a mere incident.—J. H. Robinson

THE development of social studies, like the growth of the natural and biological sciences, is a characteristic feature of nineteenth-century thought. This was natural, for the rapidly increasing complexity of political, social, and economic life produced innumerable practical and theoretical problems that demanded solution. Great interest was manifested in all that man had wrought ever since Paleolithic times. The increase in scientific investigation helped to stimulate more thorough study of every aspect of culture. This deepening interest is revealed by the number of studies in history, archaeology, anthropology, economics, sociology, and statistics.

History. History is the oldest of the social studies, its origins being lost in the obscurities of folklore and poetry. Many significant historical works were written before the development of the scientific approach to historical studies or the nineteenth century. The ancient Hebrews, for example, contributed the Book of Kings; the Greeks, Herodotus, Thucydides, and Polybius; the Romans, Livy, Caesar, and Tacitus; the Middle Ages, Bede, Otto von Freising, and Froissart; and the Renaissance, Machiavelli. History is the most inclusive of the social sciences, for historians study every aspect of culture; for centuries, sociology, economics, and anthropology, in so far as they were studied at all, were grouped under history.

Historians must understand the motives of men who lived many centuries ago; they must decide what is gossip and what is reliable report. Sometimes historians must determine whether a document is forged or genuine, as in the case of the Donation of Constantine, supposedly issued by the Emperor Constantine (*d.* 337) giving Pope Sylvester extensive privileges, including freedom from governmental interference and an independent position in Rome and Italy. It was long believed genuine, but Laurentius Valla (1405–1457), an Italian Humanist, showed that Constantine never delegated such extensive powers to the Pope. Valla's

methods, used to prove that the document was a forgery, have been adopted by historians in testing the genuineness of all sorts of historical writing.

A classic example of critical scholarship is the *Dissertation on the Epistles of Phalaris* by Richard Bentley (1662–1742), a scholar well versed in Greek and Latin literature. Phalaris was one of the tyrants who ruled over Agrigentum from about 570 to 554 B.C. An edition of letters ascribed to him was published in 1695. Bentley thought that they were written much later, for towns mentioned in them were not founded until several centuries after the death of Phalaris. Moreover, he discovered that the authors of these letters had imitated the language of writers who lived after Phalaris and even made references to the Greek tragedians of the fifth century B.C. From these and other facts, Bentley concluded that the letters were written after 200 B.C. This work, the most remarkable critical historical essay published before the nineteenth century, ushered in a new era in historical criticism.

Of the historians of the Age of Reason, the most important was Voltaire. His *Essay on the Customs and Spirit of Nations* and *Age of Louis XIV* deeply influenced historical studies. Their peculiar significance lies in the fact that for the first time the emphasis was on science and humanity rather than on kings and battles. The *Essay on the Customs and Spirit of Nations* begins with an account of the races of mankind and discusses savages, primitive government, peoples of classical antiquity and the Orient, and the civilization of medieval and recent times. This work is the parent of what we today call the "history of civilization." The *Age of Louis XIV* is a bird's-eye view of European and French society of the time. Voltaire wrote as follows: "It is not only the life of Louis XIV that we propose to write; we have a greater object in view. We mean to set before posterity not only the portrait of one man's actions but that of the spirit of mankind in general, in the most enlightened of all ages."

Further changes took place in historical studies after Voltaire. Men objected to the shallow rationalism of the age. Rationalists believed that the simple exercise of reason was sufficient to explain the most difficult problems of culture; they disdained to study the past. This was wrong, for culture is a matter of slow growth, some of its elements going back even to the Paleolithic Age.

The Romantic movement, influential during the last decades of the eighteenth century, sprang from dissatisfaction with the ideas of the Age of Reason. Students of the Romantic Age turned their attention to the way in which things had evolved. They studied origins, beliefs, enthusiasms, and relationships. Two men led the way in developing a new historical method. The first, Friedrich August Wolf (1759–1824),

was profoundly interested in language as an expression of the life of peoples, particularly the Greeks and Romans. Applying his ideas to Homer's *Iliad* and *Odyssey*, Wolf in 1795 published his conclusions under the title *Prolegomena to Homer*. He believed that these poems were composed of fragments by various poets and that the poet Homer never existed. Although Wolf's thesis was far from correct, the idea that a literary text may be composed of elements belonging to different periods and reflecting different cultural conditions has become part of the critical method of modern historians.

Wolf's work on the Homeric poems stimulated Barthold Niebuhr (1776–1832), a professor at the University of Berlin, to attempt a reconstruction of the early history of Rome from its songs, the substance of which he thought was preserved in such legends as that of Horatius at the bridge. Niebuhr brought Wolf's methods to historical science. Thenceforth, myth, legend, and song received the serious attention of students interested in the historical growth of a country. Niebuhr's great *Roman History* therefore stands at the very top of the early history of the science and art of historical writing.

With the French Revolution and the Napoleonic Wars, which came to an end in 1815 with the Treaty of Vienna, there opened a new era for historical studies. Nationalism and liberalism thenceforth guided the life and thought of Europe and are reflected in the writing of history. At the same time, historical studies became more thoroughly scientific. The famous Ecole des chartes, organized in 1829 at Paris, provided a 3-year course to prepare candidates for posts as archivists and teachers. Students were given thorough training in philology, diplomatics, paleography, numismatics, literature, and history. Many great historians of France were trained at the Ecole des chartes. Other nations followed this example and established similar courses in their universities.

Interest in national history led governments to establish archives, repositories in which public documents are kept. The French Revolution and Napoleonic Wars had put an end to the special rights of ancient families and monasteries; and when their properties were confiscated, records of all kinds were scattered. Documents of city governments were neglected and in many cases so poorly housed that they decayed. The patriotism of the new age aroused interest in historical study and inaugurated a better policy with regard to these collections. The French government established institutions to preserve archives in each *département*, placing them under a central administration. The *Archives nationales* was opened in Paris as a national depository. Other governments did the same, and today European states possess archives, or record offices, that are managed scientifically and effectively for all who wish to investigate the past.

Particularly affected by the spirit of nationalism, Germany made notable contributions to historical study. Napoleon had carved up Germany to suit his political convenience, with the result that German nationalistic feeling burned with a white heat during the reconstruction period that followed. The University of Berlin, founded in 1810, led the way by making the study of national history a pious duty. Special courses called "seminars" were established in which students were given practical training in how to become historians. In 1815 a commission of historians was named by the Prussian government to publish the ancient chronicles and documents. This was the beginning of the famous *Monumenta Germaniae historica*, or *Monuments of the History of Germany*, the first volume of which appeared in 1826. At the present moment, this collection numbers over 130 large volumes. Imitating the German example, other countries began the publication of similar collections. The Société de l'histoire de France has published chronicles, documents, and memoirs illustrating all aspects of French history. In England the great *Rolls Series* appeared; it contains the chronicles of medieval English history.

With such zeal for the study of the past evident in even the smallest countries, great progress was made. Historical societies were formed, sometimes with state support, and became active centers for research on all kinds of historical topics. Special studies called monographs were published, and historical journals were founded. The German *Historische Zeitschrift*, or *Historical Journal*, begun in 1859, has been a leading organ of historical scholarship. Similar journals appeared in other countries—in France the *Revue historique* (1876), in England the *English Historical Review* (1886); and in the United States the *American Historical Review* (1895). Many journals devoted to limited periods were founded; the *Speculum*, for example, organ of the Medieval Academy of America, was begun in 1926. Such publication makes it possible for university students to investigate the history of most foreign countries in great detail.

To discuss all the great historians within the narrow limits of this chapter is impossible. Only a few of the more important can be mentioned. Leopold von Ranke (1795–1886), a professor at the University of Berlin, was less swayed by nationalism and patriotic pride than many of his contemporaries. He tried to describe events exactly as they had occurred. He visited libraries and archive offices and systematically read the correspondence of diplomats. No one had yet made such painstaking researches. In 1834, Ranke published his *History of the Popes*, carrying the narrative down to 1870 and containing an appendix of important documents. This work was followed by his equally fine *History of the Reformation in Germany* and *Civil Wars and Monarchy in France*. Ranke has justly been called the first of the modern historians.

Another German historian of scientific preeminence was Theodor Mommsen (1817–1903). He began his career as a student of law and never abandoned his interest in the legal aspect of history. He spent some time in Rome studying coins and inscriptions, laying the groundwork for his later work in Roman history. He served as professor at the University of Berlin from 1858 till his death. His *Corpus inscriptionum Latinarum*, or *Collection of Latin Inscriptions*, contains all Latin inscriptions that had then been discovered. This work was of the utmost importance, for it provided a wealth of new historical data, which supplemented the literary works of ancient authors. His *Roman History* traces the fortunes of Rome to the end of the republic. This work was followed by the *Roman Provinces under the Empire*, *Roman Civil Law*, *Roman Penal Law*, and a *History of Roman Coinage*. The greatest modern historian of Rome, Mommsen was the first to make use of all literary and archaeological materials. Not only a most patient investigator, he also combined extraordinary knowledge of detail with insight. Many students were stimulated by his brilliant generalizations. His writings represent the highest attainment of nineteenth-century critical historical scholarship.

From the beginning of the Romantic movement, men had been charmed by the color and movement of medieval life. Sir Walter Scott's *Ivanhoe*, *The Talisman*, and *Quentin Durward* are but one expression of this passion. Historians wrote glowingly about the Middle Ages, thereby often surrendering to romantic prejudices. Thus Jacques Nicolas Augustin Thierry (1795–1856) believed that the Anglo-Saxons were a great liberty-loving people who defended their freedom against invaders and kept this spirit alive until the time was favorable for it to blossom in the English Parliament. These ideas were warmly advanced in his *History of the Conquest of England by the Normans*. Thierry championed democracy and parliamentary monarchy; he was a liberal of the type common after the Treaty of Vienna. Believing in the rights of the common man, he studied popular movements in the Middle Ages. This was the moving reason behind his *History of the Third Estate* and his *Collection of Unpublished Documents of the History of the Third Estate*. Jules Michelet (1798–1874), a patriotic and nationalistic historian, became a professor at the University of Paris and published a *History of France* that dramatically related the course of French history. Possessing deep love for the pomp and color of the Middle Ages, he was the first historian to produce a true though picturesque account of those times.

Thomas Carlyle (1795–1881), one of the chief English romantic historians, was born in Scotland and brought up under strong Calvinist influences, which explains why moral reflections are so large an element

in his writings. His romanticism, revealed in warmth of color and vigorous passion, centered in the lot of the common man.

Which was the greatest factor, he who gained the battles of Cannae and Trasimene or the nameless poor who first hammered out for himself an iron spade? Battles and war-tumults pass away like tavern brawls. Laws themselves, political institutions, are not our life, but only the house in which our life is led. Nay, they are but the bare walls of the house, all whose essential furniture is the work of a long-forgotten train of artists and artisans who from the first have been jointly teaching us how to think and how to act.

Unlike Rousseau, Carlyle had no exaggerated notions about the natural goodness of man. Thus, the thesis of *Heroes and Hero-worship* is that, while hard work is the rock on which civilization is built, great men alone supervise its construction.

Even more popular than *Heroes and Hero-worship* was Carlyle's *French Revolution*, which for decades taught Englishmen how to view the revolution. As a literary work, it ranks high among English masterpieces. Carlyle successfully aimed "to splash down what I know in large masses of color that it may look like a smoke and flame conflagration in the distance." His thesis is that the common man, sunk in the misery of his toilsome existence, is incapable of forming an ordered society. His revolt against the tyranny of French political and social life caused the frantic and destructive outbursts of the period. *The French Revolution* is a one-sided portrayal, but it had great appeal for upper class liberals of the nineteenth century, who feared the aspirations of the lower classes from the miserable environment of a newly industrialized society.

Thomas Babington Macaulay (1800–1859), a brilliant stylist, is the best example of the English political historian whose point of view was dictated by the ideas of the Liberal party, or Whigs. English Liberals believed in a parliamentary government in which the king's ministers were to be controlled by the elected representatives of the middle class. This class, which had become influential because of the development of commerce and industry during the Industrial Revolution, was to be given the right to vote. Macaulay believed that such a political arrangement was the best for any country and was convinced that England's greatness was due to the rise of her parliamentary government. Such were the ideas of the Whigs, and Macaulay presented the development of England from this point of view. His *History of England* begins with the year 1685 but remains unfinished, as the narrative closes with the year 1702.

George Grote (1794–1871) was a political historian of the liberal type, with interests, however, very different from those which inspired Macaulay. Grote was interested in the aspirations of the common man.

Attracted by the democratic age of ancient Greece, which flowered in the days of Pericles, he did not care for the middle-class Liberalism of Macaulay. Grote's *History of Greece* retails the story of the Greek communities from their beginning to the days of Alexander the Great. This is a far more penetrating work than Macaulay's, for its author tried to grasp the interrelations of Greek social culture.

A great change came over the writing of history in the middle of the nineteenth century, for historians like laymen are influenced by the issues of the day and tend to act in the light of their experience. The Revolution of 1848, which developed in many countries in Europe, was partly due to the exploited condition of the lower classes. We have noted that Karl Marx's *Communist Manifesto* of 1848 was a characteristic expression of the social discontent of the time. The romantic idealization of liberty gave way to a more materialistic conception in historical writing. This tendency was reinforced by the publication of Darwin's *Origin of Species* in 1859. Historians more and more tended to adopt an economic and materialistic view of events.

In his *History of Civilization in England*, Henry Thomas Buckle (1821–1862), an English historian, championed the view that the creative factors in civilization are mainly economic. Buckle held that climate, soil, and food control society. Intellectual activities are molded by these factors and can be reduced to simple laws illustrated statistically. According to Buckle, history should become a science. He was deeply influenced by the rationalist type of thought prevalent during the eighteenth century, which colored his views about church, religion, the Middle Ages, the Reformation, primitive man, and other topics. Although few today subscribe to Buckle's simple rationalizing about the history of civilization, nevertheless he exerted vast influence.

Buckle's historical writings were called *Kulturgeschichte* by the Germans, a word that may be translated as "history of civilization," or "cultural history." The basic conception of such writing is that the varied aspects of civilization should be studied in their interrelations. One of the most important of all writers of *Kulturgeschichte* was the German-Swiss Jakob Burckhardt (1818–1897), who for many years served as professor of history and the history of art at the University of Basel. He is noted for his widely influential *Civilization of the Renaissance in Italy*, published in 1860. It has justly been called "one of the most original works in historical literature." Burckhardt's idea was to describe state, society, war, politics, thought, art, and letters as so many interrelated segments of Italian Renaissance life. At once hailed as a classic, this book was widely imitated.

American historians appeared whose works rank high among literary masterpieces. William Prescott (1796–1859) produced excellent histories

on Spain and the Spanish conquest of the Americas. The first is represented by the *History of Ferdinand and Isabella the Catholic* and the *History of the Reign of Philip the Second, King of Spain*, the latter by the *History of the Conquest of Mexico* and the *History of the Conquest of Peru*. The narrative is clear and vivacious, but the author rarely penetrates into the inner meaning of social phenomena nor does he comprehend the relationship between the culture of the Indians and that of the Spaniards. Nevertheless, Prescott's books have been favorites with readers of history, and professional historians still find them indispensable.

Francis Parkman (1823–1893) studied the rivalries of the French and the English for the control of North America. He recounted in clear and vigorous style and with great accuracy the long contest that came to an end with the defeat of France in 1763. One peculiarity of Parkman's was his romantic affection for the aborigines of North America; in this respect, he continued the theories of Rousseau about the natural goodness of man in primitive societies.

John Lothrop Motley (1814–1877) undertook the absorbingly interesting study of the struggles of *The* Netherlandish people for independence. He was a brilliant stylist, and his books won an extended audience. His *Rise of the Dutch Republic* recounts the heroic struggle of the Netherlands for freedom from Spain to the death of William of Orange. The story was continued in *The History of the United Netherlands* and *The Life and Death of John of Barneveld*. Like the volumes of Prescott and Parkman, these works enjoy an assured place among historical masterpieces.

History is a vast subject, and historians as a rule have shown their greatest skill in describing particular aspects of the growth of civilization. At present few historians study the entire history of civilization or even the entire history of one country. The best historical scholarship today consists in minute studies of restricted topics presented in special monographs or critical articles. An excellent example of a critical monograph is Heinrich von Sybel's (1817–1895) *History of the Crusades*, a study in which popularly accepted stories are shown to be false. Albert H. Lybyer's *Ottoman Turks and the Routes of Oriental Trade* is an excellent critical discussion in the form of a brief article in a historical journal.[1] It disproves the belief that the seizure of Constantinople by the Turks in 1453 broke commercial connections between the Italian cities and the Far East and thus caused Europeans to sail westward to China. Frederick J. Turner's (1861–1932) *Rise of the New West, 1819–1829* is a similarly suggestive historical essay.

Geography. Geography, related in many ways to history and the other social studies, developed rapidly during the sixteenth century.

[1] *English Historical Review*, Vol. XXX, pp. 577–588, 1915.

The great voyages of discovery dating from the close of the fifteenth century had revolutionized geographical knowledge. After the new lands had been discovered, an effort was made to represent the known lands of the world on a simple plane. It seemed impossible to represent the earth's spherical surface on a flat surface. Gerhard Kremer (1512–1594), or Mercator as he was more commonly known, produced his planisphere, a map of the then known lands of the world. A feature of this map was the parallel arrangement of lines of longitude. When we look upon the globe, we observe that longitudinal lines are farthest apart at the Equator and that they join at the poles. On Mercator's map, they are parallel, which produces a distorted view of the earth's surface. From the point of view of navigators, however, this method of representing coast lines proved beneficial.

Navigators sailing to the Americas and the East Indies were greatly enlarging geographical knowledge. Mercator spent the last years of his life compiling an atlas, which appeared in 1595, a year after his death. His friend Abraham Ortelius (1527–1598) had already published a similar work in 1570, of which a greatly revised edition containing over a hundred large maps appeared in 1591. Gradually, atlases became more complete and the maps showed constant improvement in accuracy and mechanical execution. The shops of Mercator and Ortelius, established in Antwerp, made these geographers the most prominent of the so-called Flemish school.

An atlas, however, is essentially different from a treatise on geography. Philipp Cluver (1580–1622), a German who worked in Leiden, was struck by the fact that no one tried to relate history to geography. A scholar of wide interests who saw that whatever man does is conditioned by the place in which he lives, he wrote an *Introduction to Universal Geography*. The first volume dealt with the earth in general, but the remaining five, in which human and historical matters were stressed, contained descriptions of the different countries. In spite of its defects—Cluver did not, for example, accept the Copernican theory—this work proved most important in the development of the science of geography.

The eighteenth century also witnessed great advances in geographical knowledge. The outlines of South America were well known, but there was much uncertainty about the northwest coast and interior of North America. There was complete ignorance about Antarctic regions and the vast expanses of the Pacific Ocean. Foremost among explorers of the southern half of the globe was Captain James Cook (1728–1779). Born in Yorkshire, he was commissioned to sail to the southern Pacific in 1768 to study the transit of Venus. He made his observations at Tahiti, after which he explored the ocean to the south, hoping to find the continent in the Antarctic south of Australia that geographers

believed to exist. After exploring the Society Islands and sailing around New Zealand, he surveyed the east coast of Australia, sailed to Java, and in June, 1770, arrived in England by way of the Cape of Good Hope. Appointed to command a second expedition (1772), Captain Cook touched at the Cape of Good Hope, sailed directly across the southern seas to New Zealand, and reached Easter Island, which had been discovered by Dutch navigators in the previous century. Its location had been forgotten, but Cook determined its position and also described the gigantic statues to be found on the island. Turning westward, he discovered many new islands, among them New Caledonia. Continuing his voyage, he reached the Cape of Good Hope, whence he sailed for England.

Commissioned to make a third voyage (1777), Cook investigated the northern Pacific Ocean and adjacent North American lands in order to solve the problem of the Northwest Passage. He sailed with two ships by way of the Cape of Good Hope, Tasmania, New Zealand, and Tahiti, discovering many islands. Early in 1778 he reached the Hawaiian Islands, after which he explored the coast of Alaska and the Arctic Ocean. On his return southward he revisited the Hawaiian Islands, where he was killed in a brawl with the natives. Cook's services to science were very great. As a navigator he covered more of the earth's surface than any white man before him and brought numberless islands of Polynesia within the sphere of European influence.

George Vancouver (*d.* 1798), a sailor who had accompanied Captain Cook on his second and third voyages, continued these explorations. Sailing in 1791 by way of the Cape of Good Hope to Tahiti and the Hawaiian Islands, he explored the west coast line of North America as far north as Cook Inlet, which, he found, was an arm of the sea and not connected with the Arctic Ocean. He also determined that there is no connection between Juan de Fuca Strait and the Great Lakes. This voyage was the first to reveal the true character of Puget Sound.

During the nineteenth century, efforts were made to explore the Arctic and Antarctic although the intense cold and vast distances made it difficult to reach the poles. But each attempt added something to the geographical knowledge of Arctic regions. Finally, in 1909, an American named Robert Peary (1856–1920) reached the North Pole. In the south it was found that the Antarctic continent was smaller than geographers had at first believed it to be. The third voyage of Sir Ernest Shackleton (1874–1922) deeply stirred the interest of the whole world. In January, 1909, he penetrated to within ninety-seven miles of the South Pole. In 1929, Richard Byrd reached the pole by airplane. One of the best known of recent Arctic explorers is Vilhjalmur Stefansson, whose books on conditions in Arctic areas created great interest.

Most important among the founders of geographical science was the German Baron Alexander von Humboldt (1769–1859). While a youth he breathed the stirring intellectual atmosphere that produced Goethe, Schiller, and Herder. Yearning to satisfy his scientific curiosity, he joined an expedition to South America in June, 1799, where he tramped over 1,725 miles through the untraveled regions along the Orinoco River, explored the sources of the Amazon and the Magdalena, crossed the Andes, and visited Mexico. Later, in 1829, he journeyed through Russia from St. Petersburg to the Yenisei River. His alert mind noted the characteristics and habitat of plants and animals, especially with reference to altitude, rainfall, winds, and nature of the soil. He collected an immense amount of information, which appeared in *Kosmos*, a monumental work published in six parts between 1845 and 1862. Humboldt made systematic descriptions of regions, stressing the relation of plants and animals to their environment.

The numerous early publications of Humboldt stimulated many young men with a bent toward geographical study, particularly Karl Ritter (1779–1859), a professor at the University of Berlin who never traveled but relied upon the descriptions of others. His *Erdkunde*, or *Geography*, a voluminous work of eleven volumes, is so masterly a work that he is considered the greatest of geographers. Ritter learned much from Humboldt and other scientists; he believed that all features of geography are so closely interrelated as to provide a basis for human life. According to Ritter, geography "aims at nothing less than to embrace the most complete and the most cosmical view of the earth; to sum up and organize into a beautiful unity all that we know of the globe." This concept of physical geography definitely became a science with Oskar Peschel (1826–1875), a professor of geography at Leipzig. He made minute studies of land forms, emphasizing their geological origins. Peschel studied mountains, valleys, islands, soils, rivers, lakes, seas, and climatic conditions with great care but neglected the phenomena of erosion, or weathering.

Physical geography now became sharply differentiated from human geography. Friedrich Ratzel (1844–1904), a professor of geography at the University of Leipzig, exerted enormous influence through his *Anthropogeographie*, or *History of Mankind*. Ratzel applied the Darwinian ideas of the "struggle for existence" and the "survival of the fittest" to physical geographical environment. Man, he held, is the product of environment; his civilization is predestined by the forces of geography. Therefore man's will, initiative, and intellectual capacity count for little. Ratzel advanced the study of geography by emphasizing the bond between man and soil. In stressing the physical aspects of geography, however, he became a facile dogmatist. An illustration of the

way in which his theories may be misleading is the idea still current that wars are always caused by overpopulation. Ellen Semple popularized Ratzel's conceptions in America through her widely read *Influences of Geographic Environment* (1911) and *American History and Its Geographic Conditions* (1913). Her views, it is important to note, are more moderate. Naturally, historians, sociologists, and anthropologists rose up in arms against the idea that culture is but an exemplification of geographic influences. Civilization is too complex to be explained by one single factor. No matter how closely man may be related to the land from which he derives his food and clothing, human life and culture are more than a mere expression of physical forces.

Regional geography has recently assumed great importance. A systematic study is made of a limited region as, for example, the Po Valley and its physical geography carefully noted. Next the human activity in such a region is studied. Proceeding without the bias of determinism, geographers now seek for enlightenment in other branches of learning. The data of botany, zoology, climatology, astronomy, and chemistry are appropriated whenever they throw light upon the life of a region. The regional geographer studies history, for he realizes that he is seeking to understand a culture with roots deep in the past. Today, geography in its broadest aspect holds an indispensable place among the social studies.

Archaeology. Archaeology, a subject of the greatest importance, may be defined as the study of antiquities such as arrowheads, hatchets, drawings in ancient caves, carbonized loaves of bread and apple seeds from the beds of Swiss lakes, foundations of buildings, bits of pottery, figures in stone or ivory, coins, pavements, burial places, structures like Stonehenge and the Acropolis, medieval churches, Aztec and Inca temples, and Norse cow barns in Greenland. Such objects speak eloquently of past life and habits. Archaeology is especially important when it elucidates a past that has left no written records. Admiration for the Greco-Roman culture led the scholars of the Renaissance to collect ancient coins and statues, study ancient buildings, and dig in sites where the Greeks or Romans had lived. Renaissance popes established the Belvedere, a museum in Rome known the world over. At first, students who searched for classical objects of art failed to work scientifically. Winckelmann, in the eighteenth century, markedly advanced the study of classical archaeology, but it was not until the nineteenth century that archaeology became a scientific study.

Egyptian archaeology received attention before that of the classical world, owing to the interest centered in Egypt by the Napoleonic campaigns. Napoleon engaged French scholars to make the first extensive survey of Egyptian ruins. They collected objects of art, among them

the famous Rosetta stone, which bears a royal decree dated 193 B.C. and recorded in three forms—in hieroglyphic characters, in demotic characters, which were read by the people, and in a Greek translation. The Rosetta stone therefore contributed a key whereby other inscriptions might be deciphered. The French orientalist Jean Champollion (1790–1832) was the first to decipher the Rosetta stone. Amazingly successful as a student of Hebrew, Ethiopian, Arabic, and Coptic, he became a professor at the University of Grenoble, where he published his discoveries in 1822 and drew up an Egyptian grammar. Champollion also was instrumental in acquiring the nucleus of the Egyptian collection of antiquities now housed in the Louvre. But actual scientific digging was not begun until Karl Lepsius (1810–1884), a noted German philologist, conducted an expedition to Egypt. The work of Champollion and Lepsius is the foundation upon which subsequent Egyptian archaeology was based. Scholars like Flinders Petrie (1853–1942) and organizations like the Oriental Institute of the University of Chicago have steadily carried forward the work of digging, collecting, and interpreting objects belonging to ancient Egyptian culture.

Lord Elgin (1766–1841), who for many years lived in Constantinople, began the archaeological study of Greek remains. Visiting the Acropolis at Athens, he was impressed with the beauty of the Parthenon although much of it had been destroyed as a result of war and neglect. Some stones had been carried away by collectors, while others had been burned to provide lime for houses. With much tact and some bribery, he secured the right to remove the finest sculptured pieces of the fifth century B.C. and deposited them in the British Museum. The "Venus of Milo," discovered on the island of Melos in 1820, stimulated organized excavations on the islands of Samothrace, Delos, and Aegina and at Delphi, Pergamum, Ephesus, Athens, Thebes, Olympia, Sparta, and elsewhere. French, British, German, American, and other scholars shared in this work. Innumerable objects were found, many of which have thrown light upon the development of Greek art.

Similar studies and excavations followed at Rome and neighboring places. The sites of Pompeii and Herculaneum, covered with volcanic debris in A.D. 79, were cleared. Etruscan tombs were opened. Works of Greek and Etruscan art including jewelry, pottery, and funeral furniture were brought to light. Keen interest was taken in the catacombs of Rome, which had remained almost wholly unexplored. Much new information was gained, and the scientific foundations of Christian archaeology were laid. Sites in Rome and neighboring cities such as the ancient Alba Longa and Veii were excavated. The result was a great increase in knowledge of Roman history and its place in the development of ancient civilization.

Excavations also were begun in the Tigris-Euphrates Valley. The ancient cities of Sumer, Babylon, and Assyria were buried under layers of refuse, and historians had only the slightest idea of their civilization. In 1845, Sir Austen Layard began to explore the site of Nineveh, and the remains of Assyrian civilization that he discovered were a revelation. His *Nineveh and Its Remains*, published in 1848 and 1849, gave a powerful impetus to archaeological study in the Tigris-Euphrates Valley.

Persia, the uplands to the east of the Tigris-Euphrates Valley, also attracted attention. The old Persian script was not understood until Georg Grotefend (1775–1853), a German philologist of great persistence, deciphered it. In borrowing cuneiform writing from the Assyrians, the Persians had simplified the system by reducing the number of characters to forty. Grotefend's work provided the key not only to the Persian but to the Assyrian and Babylonian scripts as well.

Hardly had Grotefend made known his discoveries when Sir Henry Rawlinson (1810–1895) duplicated his achievement. As a youth, Rawlinson saw service with the East India Company and learned modern Persian. Later, he went to Persia to assist in the reorganization of its army. His great accomplishment was to decipher one of the inaccessible inscriptions on the Behistun rock, which he studied through field glasses, publishing his results in 1838. The work of Layard, Grotefend, and Rawlinson was the beginning of a sustained and successful archaeological investigation of the Tigris-Euphrates Valley and then of Persia, Palestine, and the lands of the Hittites. The relation of the Egyptian and Tigris-Euphrates Valley civilizations to each other and to neighboring civilizations has been sufficiently traced so that today it is possible to follow the growth of civilization in those regions from the late Neolithic Age to the rise of the Greeks.

Little or no progress as yet had been made in the study of prehistoric Greece. Nothing antedating the poetic assertions of Homer and Hesiod or the statements of Herodotus existed as a basis for scholarship. This changed when Heinrich Schliemann (1832–1890) began excavations at the site traditionally held to be Troy. Schliemann began life as a grocer's apprentice, went into business for himself, and, after becoming wealthy took up the study of archaeology. Believing that the *Iliad* and the *Odyssey* held much historical fact, he moved to Greece and employed his vast fortune in excavating ancient sites to prove his contentions. By 1873, he had laid bare a part of an ancient city he romantically called Troy. The remains he described as Trojan in reality belong to an earlier age, but the learned public of Europe, which knew the *Iliad* and the *Odyssey*, were enthusiastic when in 1875 Schliemann published his *Troy and Its Remains*. He next began digging at Mycenae, where he found objects belonging to Mycenaean culture that antedated

the Homeric scene. Perhaps the Homeric poems after all contained much historical fact.

Archaeologists now perceived that Mycenaean culture had been imported into Greece from beyond the sea and thus turned their attention to Crete. Sir Arthur Evans (*b.* 1851) began systematic exploration of Knossos, where he excavated the remains of a city that flourished before the migrations of the Greeks. These explorations revealed a remarkable civilization of the third millennium B.C., which borrowed elements from Egypt and Asia and was the parent of Mycenaean culture. Thus scholars were able to piece together a consistent history of the growth of eastern Mediterranean culture. For the first time, it was possible to give a satisfactory account of the backgrounds of Greek civilization.

Attention was directed also to the material remains of the Paleolithic Age. It was universally believed that man had appeared on earth only a few thousand years ago. This thought kept people from studying the chipped flint axes found from time to time and popularly called "thunderstones." People marveled at the impressive stone remains of Brittany. Stonehenge was a baffling mystery. The people of the Netherlands called the many dolmens in their country "Huns' beds." But these fanciful notions ceased when scholars in the eighteenth century came to the conclusion, after investigating burial places in Germany dating from prehistoric times, that there was a succession of cultural ages to be noted in them. This idea no doubt was suggested in part by the speculations of writers like Lucretius. A Danish scholar, Christian Thomsen (1788–1865), Director of the Museum of Antiquities in Copenhagen, showed that prehistoric culture developed in a chronological sequence. He divided prehistory into the Stone, Bronze, and Iron ages. His chronology, published in 1836, was widely accepted. This was a period of feverish activity in all branches of science that had a bearing on the early history of man. In 1863, Sir Charles Lyell, for example, published his *Geological Evidences of the Antiquity of Man.* Charles Darwin's *Origin of Species* had appeared four years earlier.

Boucher de Perthes (1788–1868), a Frenchman, believed that stone artifacts were very ancient, dating, as he stated, from a time "before the Flood." "In spite of their imperfection these rude stones prove the existence of man as surely as a whole Louvre would have done," he declared. He published his discoveries in 1846, but these were greeted with ridicule. Gradually, however, his work bore fruit, for prominent scientists like Lyell accepted his conclusions.

It remained to determine the antiquity of man with reference to his geological backgrounds. Edouard Lartet (1801–1871), a French lawyer, explored caves in southern France and came to the bold conclusion that man inhabited the earth in Tertiary times. Lartet's lifelong work

aroused much interest and produced the great school of French prehistoric archaeologists. Soon it appeared erroneous to classify all the ages in which man used stone implements under the simple term "Stone Age." Accordingly, Sir John Lubbock in 1865 suggested that the Stone Age be divided into the Paleolithic Age and the Neolithic Age.

An important accident led to the discovery of remains dating from the Neolithic Age. Scholars were acquainted with the smooth or polished instruments of Neolithic times, but had not yet discovered fossil remains of perishable objects. During the winter of 1853 and 1854 the water level of Swiss lakes was so low that piles of villages erected by lake dwellers were exposed. Someone began digging in the mud around these piles and found an unusual number of neolithic objects. Fossilized seeds and grains and even carbonized loaves of bread were found amid tools made from bone and polished stone. Such discoveries enabled archaeologists to piece together a more or less consistent picture of neolithic culture.

Investigations likewise were conducted on sites where remains of Bronze and Iron Age culture were found. Bronze Age culture in Sweden was represented by objects dating from about 1600 B.C., which showed that the remote land of Scandinavia shared in the general cultural development of the West. Bronze Age objects dating from about 2000 B.C., exhumed in the cemetery at Aunjetitz in Bohemia, proved conclusively that there was a diffusion through central European lands of designs and patterns from Asia Minor that had been borrowed from the Tigris-Euphrates Valley. Similarly striking results illustrating the culture of the Iron Age were obtained when the Hallstatt and the La Tène cultures were explored. A constant cultural development was shown to have existed in central Europe for several millenniums B.C.

Archaeologists have also excavated the sites of pre-Columbian culture in North and South America. The cities of the Mayas of Mexico and Central America have revealed a civilization that antedates the Christian Era. The Inca confederacy of South America had a similar early civilization, which in many of its aspects owed little to the Mayas. These cultures were independent creations owing nothing to Egypt, the Tigris-Euphrates Valley, or China. The cultural traits of Mexico and Central and South America apparently spread to other parts of America. Thus arose a new culture in the southwestern parts of the United States, particularly in Arizona and New Mexico. Constant excavating is in progress, and a clearer picture of the cultural development of American aborigines may be expected in the not-too-distant future.

ANTHROPOLOGY. The science of anthropology made great strides during the second half of the nineteenth century. The term "anthro-

pology" is vaguely defined as the science of man. It is divided into the following three branches: cultural anthropology, which deals with various aspects of culture; archaeology, the systematic study of human handiwork; and physical anthropology, the study of man's physical characteristics and their history.

It is practically impossible in the narrow limits of this short chapter to indicate the achievements of more than two or three cultural anthropologists. The first to be noted is the Englishman Edward B. Tylor (1832–1917), during whose early years the discoveries of men like Faraday, Darwin, Huxley, and Wallace were being revealed. He did not attend a university and thus, like Darwin, never profited from a formal education. Soon after his visit to Mexico in 1856, he published *Anahuac, or Mexico and the Mexicans*, the beginning of a long career of anthropological study. A clear thinker, Tylor was able to detach himself from preconceived ideas. He was the first to elucidate the art of fire making in primitive times. He studied the problem of how culture spread over the earth and argued for diffusion, independent invention, and constant adaptation and modification. Tylor also studied the religious thought of man and held that animism was the root of religion and that religious beliefs such as ancestor worship, polytheism, and monotheism all grew out of it. His animistic theory of religion, set forth in *Primitive Culture* (1871), became immensely popular. This view, it is obvious, was derived from the concept of evolution generally accepted after the publication of the *Origin of Species* in 1859.

James G. Frazer (1854–1941), another pioneer anthropologist, collected data about religion from all quarters of the world. His monumental work is *The Golden Bough: A Study in Magic and Religion*. With Tylor, Frazer believed that animism was a primitive form of religion. But he argued that in addition to the world ruled by personal or animistic forces there were impersonal magical forces at work. He agreed with Tylor that out of the former religion developed, but insisted that out of magic, the manipulation of impersonal forces, came science. His characteristic teaching was that magic was an earlier phenomenon than animism. When primitive man could not control forces by magic, he sought to placate them by sacrifice and prayer. The evolutionary school of religion, which made extensive use of Tylor's and Frazer's teachings, has become discredited in recent years, however.

The fact that in the middle of the nineteenth century many parts of the world were inhabited by men still living under primitive cultural conditions untouched by the culture of white men greatly furthered the study of anthropology. Tasmanian culture suggested the life of paleolithic times. Australia, Melanesia, Polynesia, North and South America, Africa, parts of Asia, and the East Indies all afforded oppor-

tunities to study primitive forms. Special investigations were made that profoundly modified anthropological conceptions. The work of the scholars called Americanists, who devote their attention to the aborigines of North and South America, is of particular significance to Americans. The dean of Americanists is Franz Boas (*b.* 1858), who has trained a large number of anthropologists in the impartial investigation of facts.

Another group of students of primitive cultures is the Vienna school, of which the most prominent members are Wilhelm Schmidt (*b.* 1868) and Fritz Graebner (*b.* 1877). They have collected studies made by observers in every part of the world and, like the Americanists, have sought to comprehend primitive thought and organization. Americanists generally objected to the evolutionary view of culture; the Vienna school has been even more strongly opposed to it. The Vienna group has developed the idea of cultural complexes, or circles, and cultural areas from which traits pass by diffusion. One of its outstanding services is to defeat once and for all the evolutionary school of culture based on biology that had grown up with Tylor and Frazer. Wilhelm Schmidt and his group hold that culture indeed evolves, but not in a simple unilinear course. In religion, for example, it is maintained on good grounds that so far as we know monotheism or at least monotheistic tendencies are as ancient as magic, animism, fetishism, or polytheism.

Economics. The consequences of the Industrial Revolution made it imperative to consider economic and social questions, thus developing the study of economics. We have discussed the ideas of Adam Smith in his *Wealth of Nations* and shown how the principles of *laissez faire* were related to the new economic order of the Industrial Revolution. Jeremy Bentham (1748–1832) applied these ideas to social and economic problems. Born in the Age of Reason and the early Industrial Revolution, he had abundant opportunity to observe the defects of English social and economic life. Bentham evolved a philosophy of political and economic relations known as "Utilitarianism" that identified moral value with usefulness. Such a doctrine opens the door to pure selfishness, but Bentham refused to make this inference. He declared that when a man acts according to his own interests and makes certain of his own happiness he serves the highest interests of others. He argued that if a man acts contrary to the happiness of his fellows he will inevitably harm himself and held that "the greatest good of the greatest number" should be the principle regulating social and economic relations. These ideas, set forth in his *Principles of Morals and Legislation*, became the cornerstone of nineteenth-century liberalism.

The ideas of Adam Smith and Jeremy Bentham profoundly influenced David Ricardo (1772–1823), who started operating in the stock market at the age of twenty-one and became very wealthy. Devoting himself

to economics, he adopted a utilitarian attitude. Exchange value, he declared, depends entirely upon market value; profits depend upon low or high wages. Wages depend upon the cost of the necessaries of life. He presented his ideas on profits, wages, and rent in his famous *Principles of Political Economy and Taxation.*

Thomas Malthus (1766–1834), an English teacher of history, applied a similar line of reasoning to the problem of population. During the days of the French Revolution, there was much uncritical belief in the perfectibility of man and human relations. Zealots believed with Rousseau that artificial laws and governments corrupt society. An English radical reformer named William Godwin (1756–1836) therefore advocated the abolition of government and private property as a necessary step in bringing about perfect relations. To these ideas, Malthus replied in his *Essay on Population,* arguing that misery and hardship are the normal lot of man. Malthus's basic argument ran as follows:

> Taking the whole earth, . . . and supposing the present population equal to a thousand millions, the human species would increase as the numbers 1, 2, 4, 8, 16, 32, 64, 128, 256, and subsistence as 1, 2, 3, 4, 5, 6, 7, 8, 9. In two centuries the population would be to the means of subsistence as 256 to 9; in three centuries as 4,096 to 13; and in two thousand years the difference would be almost incalculable.

Population is limited by the means of subsistence. The struggle for existence results in hardships, vice, and misery. The happy society dreamed of by optimistic radicals who followed in the footsteps of Rousseau could never be realized.

Adam Smith, Malthus, Ricardo, and others constituted what is known as the "classical school of economists." Their watchword was *laissez faire.* They believed that there should be full freedom of contract, unhampered operation of the "law of supply and demand," and no governmental interference. These ideas became popular in England among manufacturers, especially the textile-factory owners of Manchester, who became known as the "Manchester school." They worked hard to bring about political reforms in harmony with their economic principles. They tried to reform the House of Commons so that they could elect more representatives, insisted on free trade, and were opposed to increasing taxes. Desiring to regulate foreign affairs in the interests of the trading class, they opposed all wars and imperialistic ventures. This type of economic thought retained a powerful hold on students during the whole of the nineteenth century.

Sociology. An aspect of the many-sided interest in social studies during the nineteenth century was the rise of sociology. As the century wore on, the consequences of the Industrial Revolution were felt in

ever-widening circles. Belgium, France, Germany, and Austria-Hungary were becoming industrialized. Social problems, as we have learned, played a prominent part in the Revolution of 1848 and subsequent social movements.

The French thinker Auguste Comte (1798–1857) greatly stimulated scientific thinking about social phenomena. Devoting much attention to the development of a philosophy of civilization, he adopted an evolutionary view of culture, a simple "law of three states of civilization." These were (1) the theological, which he described as purely "fictitious"; (2) the metaphysical, which was abstract and therefore "unreal"; and (3) the scientific, which was "positive." Only practical social facts were to be studied; their metaphysical aspects were to be ignored, as the modern "positive" age had no use for them. Abstractions were to be shunned; sociology was to become a concrete science like chemistry. It was to be a useful science, for after the "facts" had been acquired sociologists would be able to recreate society. As Comte lived before the study of anthropology had made much progress, his fanciful law of the three states of culture at present is hopelessly out of date. Nevertheless, his ideas still exercise considerable influence.

Less spectacular than the sweeping views of Comte but more productive of sound sociological learning was the work of Frédéric Le Play (1806–1882). He believed that social study can be successful only if research workers study small units of people living in particular areas and engaged in a specific type of labor. Accordingly, Le Play (1) took the family as the unit, (2) studied families established in various parts of Europe as, for example, France, southern Russia, and Sweden, and (3) investigated their peculiar means of subsistence, that is, their kind of work. In this way, he collected accurate data, which were published in *European Workers*. He formed an international organization to make "practical studies of social economy." Le Play's example and writings have exerted a great and beneficial influence; they are responsible for the present vogue for making intensive surveys.

An aspect of the development of sociological study was the use of statistics. Not until the eighteenth century did governments begin to keep statistics on population and economic and other political activities. By the middle of the nineteenth century, there was a vast accumulation of such data, which today has attained colossal proportions. The beginnings of statistical science were made when a London haberdasher named John Graunt (1620–1674) studied the weekly "bills of mortality" published by the parish clerks of London. His *Natural and Political Observations* published in 1662 contained much information about the population of London, a kind of study called "demography." Sir William Petty (1623–1687) carried Graunt's work much further. In

addition to mortality statistics, he collected data concerning different kinds of land, rents, tithes, houses, chimneys, trades, religion, and sexes. The employment of statistics naturally appealed to economists and to sociologists. Statistical science has steadily increased in importance; today, it is one of the rocks on which economic and sociological study rests.

The development of the scientific spirit responsible for the phenomenal growth of the physical, mathematical, and biological sciences also caused students to turn their attention to the study of culture. Historical study, which dated from ancient times, was perfected and extended to every age and country. Archaeology, anthropology, economics, and sociology, which had received only slight attention before the French Revolution, were so rapidly developed afterward that at the present moment each of these subjects constitutes a specialty of enormous proportions, possessing an abundant literature requiring special methods of study. More and more as we realize that culture is an accumulation of what man has taught and wrought will the study of the history of civilization together with geology, anthropology, archaeology, economics, and sociology become indispensable.

FOR FURTHER READING

Barnes, H. E.: *A History of Historical Writing*

——— and Howard Becker: *Social Thought from Lore to Science*

Boule, Marcellin: *Fossil Man: Elements of Human Palaeontology*

Bowman, Isaiah: *Geography in Relation to the Social Sciences*

Calverton, V. F. (ed.): *The Making of Man*

———: *The Making of Society*

Carrington, R. C.: *Pompeii*

Casson, Stanley: *Progress of Archaeology*

Gooch, G. P.: *History and Historians in the Nineteenth Century*

Haney, L. H.: *History of Economic Thought*

Lowie, R. H.: *The History of Ethnographical Theory*

Magoffin, R. V. D., and Emily Davis: *Magic Spades: The Romance of Discovery*

Marett, R. R.: *Tylor*

Marvin, F. S.: *Comte, the Founder of Sociology*

Michaelis, Adolf: *A Century of Archaeological Discoveries*

Nevins, Allan: *The Gateway to History*

Petrie, Sir W. M. Flinders: *Seventy Years in Archaeology*

Sorokin, Pitirim: *Contemporary Sociological Theories*

Wolf, Abraham: *A History of Science, Technology, and Philosophy in the 16th and 17th Centuries*

Chapter L

PROGRESS IN MEDICINE AND SANITATION

To lead mankind to make of the teachings of science a means to increase not only material prosperity, but also general happiness, is the highest and hardest task of the teachers of today.—E. N. da C. Andrade

PROGRESS in the medical arts, one of the most impressive triumphs of man, is typical of the forces of modern culture. The basic sciences of physiology, anatomy, psychology, physics, chemistry, and botany have made invaluable contributions to the battle against disease. The humanitarian impulse and scientific spirit together have evoked experimental endeavor in all branches of medicine, surgery, and sanitation. The Industrial Revolution with the attendant growth of population and ever-increasing interdependence of people—local, national, and international—has made sanitation and preventive medicine an absolute essential for life under modern conditions. In such circumstances, modern medicine is social; it also is an art, for it depends upon the skillful use of science and dexterous technique.

Since medicine is both science and art, it is an important part of culture. Progress in the fundamental sciences such as chemistry and physics spells advance in medicine. The more thorough man's knowledge of nature, the more successful will medical work become. And further, the quality of medical practice is directly dependent upon ethics, which derives from man's conception of himself, his destiny, and purpose, and relationship with the world of which he is part.

Seventeenth- and Eighteenth-century Medicine. The seventeenth century marked an epoch in medical progress. The discoveries of William Harvey, who discovered the circulation of the blood, are sufficient to make this age notable. Swammerdam, van Leeuwenhoek, and Malpighi added further glory to the medical achievement of this century. The scientific conception of life especially exemplified by Isaac Newton proved stimulating, for it helped physicians and surgeons to take a more rigidly scientific attitude. Chemistry also contributed to the knowledge of healing drugs. The development of the microscope, perfected by Robert Hook (1635–1703), proved invaluable in extending medical knowledge.

In spite of the great progress made, this was but a beginning. A vast amount of medical lore derived from medieval and Greco-Roman

times, still accepted in the eighteenth century, had no scientific foundation. The ideas regarding the four humors inherited from Alexandrian medicine still were widely held. There also were numerous practices based upon superstitions and folklore that perhaps dated from the Stone and Bronze ages. The strangest remedies were prescribed, such as bone marrow, cockscomb, crab's claw, powdered bones, crushed ants, unicorn's horn, and powdered mummy. Wolves' oil was used to make joints supple; foxes' lungs were thought to be good for asthma. Bleeding was universally practiced; cupping, plasters, and poultices were generally employed. Cautery, searing with the hot iron, was considered indispensable for dog bites. The most astounding prescriptions were made up of ten, twenty, sixty, and even more ingredients, many of them repulsive—the greater the number of ingredients, the more potent the medicine.

From the viewpoint of present medical practice, seventeenth- and eighteenth-century surgery appears atrocious. Barbers bled patients, lanced boils, set bones, dressed wounds, and even treated syphilis. Mountebanks extracted teeth and pretended to remove stones from the heads of the mentally defective. The most serious surgical operations were amputations. There was no anesthetic; patients were held firmly while surgeons swiftly cut muscles, blood vessels and ligaments and sawed through bones. Wounds were then seared with white-hot irons. Caesarean operations were occasionally performed.

William Hunter (1718–1783) and his brother John Hunter (1728–1793), two Scottish physicians, made notable contributions to anatomy. Heretofore, surgery had been a practical art, having only the loosest connection with anatomy. William Hunter used his knowledge of anatomy so effectively that he became the most skillful obstetrician in London and, next to his brother John, the most competent anatomist in Europe. John Hunter made many contributions to anatomy and pathology and collected specimens that today form part of the museum of the Royal College of Surgeons in London. His great work was to join surgery to anatomy and pathology. It is strange that medical men were slow to recognize the obvious fact that medical practice should be based upon a thorough knowledge of each of the branches of medicine.

Another all too prevalent condition was the tendency among physicians to be encyclopedic, the common fault of the intellectuals of the age. Learning consisted in amassing facts and respecting authority. To be a physician, one read Hippocrates, Celsus, and other worthies. Book learning was more useful than direct observation, the ability to read Greek and Latin more important than a knowledge of physics, chemistry, anatomy, or physiology. This pedantry has been effectively satirized by Molière in *The Imaginary Invalid.*

What was needed above all else was sanity and a willingness to substitute the study of cases for the reading of authorities. Thomas Sydenham (1624–1689), an Englishman and the son of a small landed proprietor, set the example. He spent a little time in Oxford before joining the Puritans against King Charles I. While in the army he gained a wide practical experience, which was fortunate, for had he continued at Oxford he would have been affected by the pedantic attitude. He even forgot the Latin he had learned; for a time, it appeared impossible for him to take an Oxford degree, but, thanks to some special influence, he finally received his degree and began practicing in London. Sydenham's method was to study diseases carefully, investigate their causes, and discover effective ways of curing the maladies. Believing bedside observation more important than theorizing, he studied the common diseases of the day—gout, smallpox, dysentery, measles, and syphilis—and produced a number of excellent monographs on them. "Nature is to be my guide" was his motto.

Contribution of the Universities and Schools. The University of Leiden was becoming famous throughout Europe for its medical science. Its great scholar Hermann Boerhaave (1688–1738) synthesized the medical conceptions that had arisen since the days of William Harvey. He entertained the greatest respect for Sydenham; it is stated that whenever his name was mentioned Boerhaave raised his hat. Boerhaave became the greatest master of bedside study in his day. He arranged to have beds set aside for clinical observation in the hospital of Leiden. Developing a sound method of studying diseased persons, he compiled histories of cases and made thorough examinations to determine the actual condition of patients. These examinations, it should be noted, were not anatomical. This practice was to develop later, especially under the influence of Morgagni, who practiced after Boerhaave had died. When a malady was studied and diagnosed, a course of treatment was outlined. This systematic method of studying disease was carried to other countries by Boerhaave's students.

The scientific voice of Padua, where Copernicus, Fracastoro, Fallopio, Harvey, and Galileo had labored, continued to influence medical practice during the eighteenth century. Giovanni Morgagni (1682–1771), who became a professor at Padua in 1711, published a number of significant studies. His greatest work is *The Seats and Causes of Diseases as Shown from Anatomy.* Although stressing careful bedside study, Morgagni supplemented it with thorough post-mortem examination. This book became influential in shaping conceptions of diagnosis and methods of treatment for several generations.

Although founded in the Middle Ages and famed throughout Europe, the University of Vienna had accomplished little in medical studies.

Rigidly bound by tradition, medical instruction made little progress until the Empress Maria Theresa, who ruled from 1740 to 1780, determined to reorganize it. She called Gerhard van Swieten (1700–1772) to the university, and in 1749 he placed medical study on a new basis, modeling it after practices at Leiden. A botanical garden was laid out, and its care entrusted to Nikolaus von Jacquin (1727–1817), also a student from Leiden. When van Swieten organized a clinic, he invited Anthony de Haan (1704–1776), a fellow student at Leiden, to assume its direction. One of the most successful masters of clinical methods of the century, De Haan published eighteen volumes devoted to bedside studies. He was the first physician to make extensive use of the thermometer; his sole aim was to arrive at a successful practice and not to prove some pet medical theory. Van Swieten and De Haan thus placed Vienna in the forefront of medical science.

The French Revolution, which began in 1789, destroyed the ascendancy in medicine of the ultraconservative University of Paris. The professors of its medical faculty, who fancied themselves secure in their privileges, were rudely shaken when the government in 1793 abolished all corporations in France. A new organization was founded in 1794, the Ecoles de santé, or "schools of health," established at Paris, Montpellier, and Strasbourg. Latin was dropped, hospitals with clinics were established, laboratories provided, and a modernized course of study was instituted. Progressive practitioners became professors, and Paris soon regained leadership in medicine.

Medical Inventions. The eighteenth century was noted for great inventions, one of which was of much value to medical science. Timepieces had become accurate measures of hours and minutes during the preceding century, but watches as yet had no hand to record seconds. An English physician, John Floyer (1649–1734), produced a watch with a second hand, which helped physicians make more accurate diagnoses by providing a reliable device to count the pulse and rate of respiration.

Another noteworthy medical discovery of this century was the method of diagnosis known as "percussion." Leopold Auenbrugger von Auenbrug (1722–1809) had often seen his father tap wine casks to determine how nearly empty they were. When Auenbrugger became a practicing physician in Vienna, it occurred to him that tapping the chest might reveal the condition of diseased lungs. The sound of a healthy chest, he declared,

> . . . resembles the stifled sound of a drum covered with a thick woolen cloth or other covering. The chest ought to be struck, slowly and gently, with the points of the fingers brought close together and at the same time extended. During percussion the shirt is to be drawn tight over the chest, or the hand of the operator covered with a glove made of unpolished leather.

Auenbrugger announced his method in 1761, but the medical world and even his master van Swieten would have none of it. Auenbrugger died without convincing his colleagues, although today he is regarded as one of the greatest of medical innovators.

The stethoscope, an invention made by René Laënnec (1781–1826), enabled physicians to hear the sounds of the heart. Laënnec noticed some children playing with a wooden tube. When a child applied his ear to one end of the tube, sounds made by tapping at the other end could be heard clearly. This gave Laënnec the idea of the stethoscope, which proved a great boon to physicians.

Progress in Physiology. The perfecting of the compound microscope about 1835 imparted a new impulse to every branch of medical science. Johannes Purkinje (1787–1869), a Bohemian appointed to a post at the University of Breslau, was one of the first to make effective use of this instrument. There was much prejudice against him, partly because he was a Bohemian and partly because his conservative colleagues could not comprehend the significance of using a microscope in the study of physiology. They objected to the laboratory that he established in the university building and even forced him to remove it. In spite of all opposition, however, Purkinje made important discoveries and was one of the first to make use of the microtome and microphotography.

William Beaumont (1785–1853) of Connecticut, a surgeon in the United States Army, is justly famous as a medical innovator. A French-Canadian named Alexis St. Martin was accidentally shot and brought to him for treatment. The bullets had lodged in the breast and abdomen; his condition was critical. Beaumont thought that recovery was out of the question, but the patient did improve. However, a fistula remained in the left side of the chest giving access to the stomach. Although Beaumont had never followed a scientific medical course, he at once realized that this case presented a rare opportunity to study the action of the stomach, a subject not well understood. He made numerous experiments and published as many as 238 reports. These studies cleared up obscure points, destroyed ancient misconceptions, and greatly advanced the study of physiology.

Medical Advances in Germany. Conditions in Germany during these years were none too favorable for the development of science. Speculative philosophy was the vogue. Scholars preferred to evolve high-sounding theories on the "philosophy of nature." But people were getting tired of this insubstantial thought, and a reaction set in. Johannes Müller (1801–1858), born in Coblentz, became a professor at the University of Berlin, where he taught pathology, physiology, and anatomy. He published his influential *Manual of Human Physiology*, in which special emphasis was placed upon the necessity of a minute

knowledge of physiology. Müller also made use of the discoveries of chemistry, physics, and anatomy. An indefatigable worker, he published many studies. The days of the old philosophy of nature were over; the new tendency was to view nature as material and mechanical.

Johannes Schönlein, another physician who had no sympathy with the prevailing philosophy of nature, insisted upon the direct study of cases. An advocate of advanced clinical methods, he established an up-to-date clinic at the University of Würzburg, the first in Germany. Later he went to the University of Zurich, where he introduced percussion, the stethoscope, and the microscope and converted his clinic into a laboratory. The great medical prestige of the University of Berlin after 1840 rested primarily upon the work of Müller and Schönlein.

Rudolf Virchow (1821–1902) ably carried forward the pathological work of Johannes Müller. Just before Virchow's arrival in 1839 as a student at the University of Berlin, one of Müller's pupils, Theodor Schwann (1810–1882), had announced the discovery that the human body, like plants, is composed of a multitude of microscopic cells. In the estimation of Virchow, the cell theory profoundly modified the status of pathology. As a result, he came to the conclusion that not only is the body composed of cells but that cells reproduce themselves. He coined the famous aphorism *omnis cellula e cellula*, "every cell comes from another cell." Disease, a condition of the cells, might be ascertained by using a microscope. In 1858, he published his epochal *Cellular Pathology*, which became the basis of pathological study and established him as the directing genius of German medical science.

Puerperal Fever. During these years an American, the poet-physician Oliver Wendell Holmes (1815–1894) produced a medical classic dealing with puerperal fever caused by a streptococcus infection occurring at childbirth. Many cases in lying-in hospitals terminated fatally, and hospitals gained a bad reputation. Sometimes physicians passed from dissections of cadavers directly to lying-in rooms without making any effort to disinfect themselves. Holmes studied the problem and in 1843 published his paper, *The Contagiousness of Puerperal Fever*. He declared that lying-in patients should never be visited by physicians engaged in dissection. Since the fever was carried from patient to patient, attendants should disinfect their hands with calcium chloride. Holmes did not spare his colleagues, whose ignorance caused untold misery; he branded every case of puerperal fever "not as a misfortune, but a crime."

Soon after Holmes published his views, a Hungarian physician named Ignaz Semmelweiss (1818–1865) came to the same conclusions. Semmelweiss was deeply disturbed by the enormous mortality among lying-in women in the Vienna hospital. One of Semmelweiss's colleagues died

from an infection caused by a cut during an autopsy (it should be noted that the streptococcus germ had not yet been discovered). Semmelweiss, like Holmes, insisted that in the clinic under his supervision every physician should disinfect his hands with calcium chloride. The mortality rate fell from 9.92 to 1.27 per cent. Physicians refused to accept Semmelweiss's teachings and continued to spread puerperal fever, but Semmelweiss insisted upon his views and made himself unpopular. To one of his opponents he wrote as follows:

> If, sir, without having refuted my doctrine, you continue to teach the students and the midwives you train that puerperal fever is an ordinary epidemic disease, I proclaim you before God and the world to be an assassin; and the history of puerperal fever would not do you an injustice were it, on the grounds that you were the first to set yourself in opposition to my lifesaving discovery, to immortalize you as a medical Nero!

Anesthetics. The effective use of anesthetics in surgery dates from the early nineteenth century. Operative surgery was soon to lose its worst terrors. Ineffective opiates such as opium and mandragora gave way to chloroform and ether. Chloroform was discovered in 1831, independently and simultaneously by three men, the German Justus von Liebig, the Frenchman Soubeiran (1797–1858), and the American Samuel Guthrie (1782–1848). The first two were chemists who worked in laboratories, but Guthrie was a practicing physician in New York. He equipped a chemical laboratory in which he discovered chloroform while distilling alcohol. He called it "sweet whisky." The first successful use of anesthetics was made with nitrous oxide, or "laughing gas," discovered by Davy in 1810. First used at parties because of its exhilarating effect, physicians recognized its possibilities and timidly began to make use of it during operations.

The dental profession, however, was quick to recognize the usefulness of nitrous oxide. Horace Wells (1815–1848) of Hartford, Conn., successfully extracted teeth with the aid of the new gas. Another dentist, William Morton (1819–1868), decided to try ether, which has the same effect as nitrous oxide. A patient who suffered from a badly abscessed tooth found it more effective than hypnotism, with which medical men were experimenting. In 1846, Morton tried ether on a person suffering from a tumor. When the patient regained consciousness after a 5-minute operation, a colleague remarked, "Gentlemen, this is no humbug." Other operations with anesthetics followed. James Simpson (1811–1870) of Edinburgh, the first to use ether in childbirth, later discarded it for chloroform. Soon anesthetics were employed all over the world. Not only did they banish a great deal of human suffering, but their use permitted surgeons to take ample time for careful work.

Dentistry. The science of dentistry had advanced little during late medieval and early modern times, and therefore sufferers from caries, pyorrhea, and decaying teeth received no relief. Toothdrawers armed with mallet, chisel, and pliers followed their questionable craft at public fairs. The making of artificial teeth dates from the eighteenth century. The plates were crude, painful mechanisms, and it was not until the middle of the nineteenth century that improvements were made. The first dental school was opened in Baltimore in 1839. New instruments were invented; the use of chloroform relieved much of the pain. One problem was to discover a suitable material as a plastic base to support artificial teeth. This was provided by Goodyear's vulcanized rubber and, in later years, by a host of synthetic plastics.

Dentists discovered new methods of filling cavities, providing bridgework, treating infections, straightening malformed teeth, and preventing decay. The practical application of electricity during the second half of the past century made dental work more efficient than ever. The X ray took much of the uncertainty out of dental diagnosis. Finally, dental surgery was perfected, and dentistry took its place beside medicine and surgery as an indispensable service.

Control of Disease. Although one of the most significant branches of medical practice, preventive medicine hardly existed before 1600. So long as the nature of disease was unknown, it was impossible to diagnose maladies and prescribe preventive methods. One disease, however, was effectively controlled in Europe during medieval times. This was leprosy, which had spread throughout Europe during the Crusades. Special hospitals, known as lazar houses, were set aside in which lepers lived like social outcasts. While this system did control and reduce the disease, no medicinal treatment of leprosy was effective until chaulmoogra oil began to be used in the nineteenth century.

The Black Death, or bubonic plague, the most notorious of medieval scourges, is caused by the bite of fleas carried by germ-infested rats. It appeared from time to time in Europe, being imported from Asia along the routes of trade. The great epidemic of Black Death in 1348 wiped out a large percentage of Europe's population. It was believed that the disease was caused by poisoned wells, for which the populace sometimes held the Jews responsible. Fires were built in the streets to drive off the plague, people shunned the contaminating breath of fellow beings, and entire families locked themselves in their homes, sealing doors and windows in the hope of escaping the infection. The Black Death repeatedly ravaged the large cities of Europe. Its most notable visitation in modern times occurred in London in 1665. The microbe causing the bubonic plague was isolated in 1894. To prevent

the plague, authorities today are required to control the rats that infest cities.

Malaria is a noncontagious disease caused by a germ carried by a certain type of mosquito. Swampy areas in warm climates have often been infested with malaria. Some historians have ascribed serious consequences to malaria pronouncing it, for example, a contributory factor in the decline of Rome. It certainly prevented the French engineers from digging the Panama Canal between 1883 and 1889. The Incas of Peru long ago discovered the value of the bark of a tree called *quinquina* in stopping fevers. Jesuit priests became acquainted with the bark and carried it to Europe in 1638. The remedy proved a boon to malaria sufferers, for the presence of quinine in the blood stream destroys the germ that breaks up red corpuscles. The life history of this germ, isolated in 1880 by Alphonse Laveran (1845–1922), was first charted by Ronald Ross (1857–1932). Thenceforth, it was a simple matter to combat malarial infection. Doors and windows were provided with screens, beds were enclosed with mosquito nets, and swamps were drained or treated with kerosene, which effectually killed the larvae of the malaria mosquito.

Yellow fever, one of the most dangerous of maladies, also spreads by means of a special kind of mosquito and, like malaria, never through human contact. This disease was common in Panama and neighboring parts of North and South America. No scientific effort was made to determine the origin of the disease until after the Spanish-American War (1898–1899), during which the United States Army Medical Corps battled with yellow fever, malaria, and other diseases. Major Walter Reed (1851–1902) with the assistance of an able staff investigated the nature and cause of yellow fever. The revelations of Reed and his associates became the basis of a campaign against yellow-fever mosquitoes. Reed's program was carried out by Colonel William Gorgas (1854–1920). After freeing Havana from the curse of yellow fever, Gorgas was appointed in 1908 to do the same for Panama. Swamps were drained and stagnant waters treated with kerosene. The results were marvelous; the mortality from yellow fever fell to insignificant proportions.

Smallpox, one of the most terrifying scourges of modern times, is an exceedingly contagious disease. So common was it during the seventeenth and eighteenth centuries that few escaped, and those who survived the infection were deeply scarred on face and hands. Shortly after 1700, inoculation with a mild form of smallpox to prevent attacks became known. It was an ancient custom in China to blow powdered smallpox scabs into the nostrils. Slave dealers in western Asia were in the habit of inoculating Circassian slave girls with the virus of a mild

form of smallpox. Inoculation with pus, known as "variolation," was introduced into England through the efforts of Lady Mary Montagu (1689–1762), wife of the British ambassador to Constantinople.

Variolation, however, possessed grave defects. The patient from whom the virus had been obtained might be suffering from other dangerous diseases. This problem was solved by Edward Jenner (1749–1823), an English physician trained under John Hunter, who practiced in Gloucestershire, where cowpox, a disease closely related to smallpox, was prevalent. Dairy hands often contracted cowpox through cuts and bruises, and it was noticed that such persons usually survived smallpox epidemics. Jenner made observations and experiments. Finally, on May 14, 1796, he took virus from the sores of a dairymaid suffering from cowpox and inoculated an eight-year-old boy, who thereupon had an attack of cowpox. In due course, the boy recovered. On July 1, Jenner inoculated him with the virus of genuine smallpox, without reaction. The operation was repeated, but the boy did not contract smallpox. Jenner reported his discovery to the Royal Society of London, but that conservative body returned his letter as unworthy of consideration. But Jenner persisted and in 1798 published one of the great books in the history of medical science, *An Inquiry into the Causes and Effects of the Variolae.* Although there was much opposition to vaccination, Jenner's treatment was hailed by a grateful people. The English Parliament was so pleased that it voted him a handsome present of £30,000. The world owes much to Edward Jenner. Today, only the unvaccinated person contracts smallpox.

Typhus, or spotted fever, is a most devastating scourge, which for centuries claimed a great toll of lives. Usually called the "plague," no effort was made to distinguish it from other diseases. It spreads by means of fleas and lice carried by rats. The fleas and lice attack human beings, particularly soldiers and refugees. The history of typhus is a dreadful one. First appearing during the fifteenth century, its epidemics have recurred regularly during wars, when great numbers of persons must live under unsanitary conditions. During the First World War (1914–1918) the Serbian army was afflicted with it, the death rate in some places being as high as 75 per cent. John Pringle (1707–1782), an army physician trained under Boerhaave, found the disease among the inmates of jails and declared that "jail fever" was the same as "army fever." It was not until 1909 that Charles Nicolle found that typhus fever is conveyed from man to man by infected lice. This discovery was made just in time to mitigate the horrors of the First World War. Typhus fever scarcely appeared among the armies of western Europe, owing chiefly to the establishment of stations in which soldiers regularly disinfected themselves.

Influenza epidemics have repeatedly appeared in Europe and America. One such occurred in 1315 and 1316 during a cold and rainy season when crops failed in most parts of Europe. The people, weakened from malnutrition, were vulnerable, and a frightful death rate resulted. It reappeared as a major epidemic in the autumn of 1918, when it caused many deaths. Influenza spreads by coughing and sneezing. John Pringle found it prevalent in the British army fighting in the Netherlands in 1743. He described it as a "short fever attended with a violent catarrh." No effective means of controling this disease has as yet appeared.

Syphilis, an ancient and dangerous disease, has claimed many victims. An especially virulent form of it that appeared in Naples in 1495 was carried to France by the army of Charles VIII. Syphilis starts its career in a mild manner so that it is scarcely noticed. Gradually, the malady becomes worse and may be accompanied by hideous sores. It takes numerous forms, one of them being paresis, a variety of paralysis. Its germ was isolated by Fritz Schaudinn (1871–1906) in 1905. After 2 years of constant effort, Paul Ehrlich (1854–1915) announced a specific known as salvarsan. This was repeatedly improved upon until finally neoarsphenamine was produced. Today not only can the ancient scourge of syphilis be eradicated, but infection may be cured if treated in its early stages.

Few epidemics have spread such consternation as Asiatic cholera. This disease from India is caused by a germ carried in drinking water. In 1854 a serious epidemic of cholera broke out in London. The victims had used water from a pump in Broad Street, whereas those living nearby who worked in a brewery and drank only beer escaped. John Snow (1813–1858), a physician, studied the problem and in 1855 produced his classic *Mode of Communication of Cholera.* In 1883, Robert Koch (1843–1910) discovered cholera germs, chiefly in water polluted by sewage.

Such are a few of the services of preventive medicine. To recount the history of the methods of combating other diseases like scarlet fever, meningitis, tuberculosis, diphtheria, typhoid fever, hookworm, pellagra, sweating sickness, and others would require many pages.

Several peculiarly stubborn diseases that defied the bacteriologist with his microscope have yielded to the investigator's persistence. It was found that they were caused by foods deficient in some vital food element. Investigators called such elements "vitamins" and identified them alphabetically beginning with "A." The chief deficiency diseases are scurvy, beriberi, xerophthalmia, pellagra, rickets, and goiter. Scurvy was long prevalent among sailors until James Lind (1716–1794), a physician attached to the Royal Naval Hospital, heard of the almost

magical results obtained from eating oranges and lemons. Having carried out some successful tests, he published his *Treatise of the Scurvy* in 1753 and recommended lemon juice as a specific. But so conservative were naval officials that his ideas were not adopted until 1795. As soon as lemon juice was included in the rations, scurvy disappeared.

Beriberi, a common disease in the East Indies and other places in the Orient where polished rice forms the chief article of food, is caused by the absence of elements contained in rice hulls. Patients afflicted with beriberi are liable to dropsy, paralysis of the arms and legs, neuritis, and heart trouble. A Japanese naval doctor discovered that by varying the diet beriberi vanished. Christian Eykman, a member of a commission appointed in 1883 by the Dutch government to study the disease, noticed that fowl fed rice from which the hulls had been removed displayed the symptoms of beriberi. When given unpolished rice, they showed marked improvement. Continuing his experiments, he proved that beriberi is caused by an exclusive diet of polished rice and not by microbes. Other deficiency diseases have been studied, with the result that the medical world is now able to treat xerophthalmia, rickets, goiter, and pellagra successfully.

Marked success attended the treatment of other ancient scourges once universally believed incurable. The ravages of tubercular infection are checked in its early stages by means of air and sunshine. In advanced cases, surgery is effectively employed. A French physician, Albert Calmette, discovered that a certain bacillus, called the bacillus Calmette-Guérin, when used as a vaccine effectively prevents tuberculosis in all but a small percentage of cases. Up to the present moment, no serum has been discovered to destroy tubercular germs lodged in the system. However, skill and science gradually are winning in the determined struggle. Pernicious anemia is now successfully controlled by eating stomach membranes and liver or extracts made from them. Addison's disease is checked by feeding patients with cortin, an extract from the cortex of the adrenal gland. Diabetes is controlled by insulin, an extract made from certain parts of the pancreas. Paget's disease, in which calcium vanishes from the bones, is checked by administering the hormone of adrenal glands. Cancer is now treated with some degree of success by radium and surgery.

Felix d'Herelle, a Mexican physician, found that certain bacteria feed voraciously upon the other bacteria. When injected into the alimentary canal, they destroy bacillary dysentery within twenty hours. The principle of the bacteriophage, or "bacteria eater," was shown to be effective in inflammations of the alimentary canal, staphylococcus infections such as boils, bubonic plague, inflammation of the bone, streptococcus infections, and even certain kinds of pneumonia. Abso-

lutely harmless to the human body, the bacteriophage can be taken in a number of ways, even hypodermically. As the bacteriophage is a bacterium, it passes readily from person to person, thus conferring immunity, a fact of the greatest significance in the science of epidemiology.

New drugs of miraculous potency appeared. Methylene blue is a sure antidote for cyanide poisoning, and sodium amytal is efficient in strychnine poisoning. Amyl nitrate is helpful in angina pectoris. Sulphanilamide and sulphapyridine are specific drugs for certain streptococcus infections. Great success in cases of severe burns follows applications of tannic acid. The Carrel-Dakin wound treatment, famous during the First World War, is based upon the antiseptic powers of chlorine, found in ordinary bleaching powder. Chloramine T is applied either in fluid or in paste form.

Modern Surgery. At first thought, it would seem that the United States of one hundred or more years ago was not favorable for the development of medicine. Medical instruction was limited to a few places like the University of Pennsylvania where men like the famed Benjamin Rush (1745–1813) represented the highest type of medical skill developed by the time of the American Revolution. But the really original work in America was performed by a number of obscure physicians on the new frontiers far from the centers of civilization. One such surgeon, Ephraim McDowell (1771–1830), pioneering in Kentucky, made a series of operations for ovarian tumors. His success inspired other American doctors to master this difficult and dangerous operation. It is to McDowell's glory that he placed ovariotomy on a permanently successful basis.

James Sims (1813–1883), practicing in Alabama, mastered the surgical technique for vesicovaginal fissures resulting from difficult childbirth. Although the profession was slow to accept his treatment, it is one of the triumphs of surgery. Later, Sims went to New York and organized the famous Woman's Hospital. The work of McDowell and Sims, to mention but two of many, gave American surgery an international reputation and proved an inestimable boon to women.

Still science knew little about the true nature of infection; the death rate from "hospital gangrene" in civilian hospitals ran as high as 40 per cent, in military hospitals as high as 90 per cent. During the American Civil War, nearly all wounds of the head and abdomen proved fatal because of gangrene. Small wonder that hospitals earned an evil reputation.

It was Joseph Lister (1827–1912), a professor at the University of Glasgow, who robbed surgery of its worst terrors. Lister wondered why compound fractures, cases where the skin was torn by protruding bones, always produced pus whereas simple fractures did not. Familiar with

the work of Pasteur, he suspected that air laden with microorganisms carried infections to open wounds. To destroy these germs became his absorbing task. He tried spraying with carbolic acid while operating. After operations, he dressed wounds with eight thicknesses of gauze saturated with carbolic acid, paraffin, and liquid resin. Wounds so treated healed without pus or gangrene. Lister's method of surgery was "antiseptic."

From antiseptic to aseptic surgery was but a step. In aseptic surgery, everything used in connection with operations is sterilized. The physician wears not ordinary clothes but disinfected garments, which are constantly changed. Hands carefully disinfected are covered with disinfected rubber gloves extending to the elbows. The mouth is covered with gauze, and the patient's face shielded by a screen to prevent contamination from coughing. All attendants are carefully disinfected, adopting the same precautions as the surgeon. Hospitals are kept rigidly clean so as to reduce contamination. As a result, modern surgery has become marvelously effective.

The X ray opened a world of possibilities to surgery during the past few decades. Antiseptic methods encouraged physicians to attack ever greater problems. Skin grafting became a successful practice. Nerve pulling proved a blessing for sufferers from chronic diseases. A new and more effective surgical knife has been invented, the radio knife, operated by means of two distinct currents of electricity. One cauterizes and seals small blood vessels so as to check bleeding while the other is used in cutting. This device permits treatment of some conditions that until its invention defied the most skilled surgeon as, for example, cancer of the rectum.

Beginnings of State Hygiene. Sound hygienic practice was virtually unknown during countless centuries although there had been some progress among the Egyptians, Babylonians, Jews, and Greeks. The practical Romans were successful in developing bathing facilities and advocated personal cleanliness. There was a decline in hygiene during the so-called "Dark Ages"; but, with the growth of medieval towns, hygienic practices revived. No hygienic system, whether ancient, medieval, or modern, proved effective in stemming plagues, however. The absolute rulers of the eighteenth century began to consider methods of preventing pestilence. Johann Frank (1745–1781), a German, published a monumental work, *A System of Complete Medical Hygiene* (1788). He advocated the adoption by the state of hygienic measures covering every aspect of life from the cradle to the grave. In 1842, the British government appointed a commission, which made a report containing a mass of statistics; as a consequence, the first public-health act became law in 1848. It provided for a central governmental authority

to establish and regulate waterworks, sewage disposal, state inspection of food, and slum clearance.

The growth of bacteriology beginning with the discoveries of Pasteur and Koch stimulated the development of efficient methods of sewage disposal. As far back as the sixteenth century, open-air "water closets" had been used. But the modern water trap cutting off the sewer gases was not produced until after the middle of the nineteenth century. Cesspools, into which sewage was drained, were dug everywhere and proved a prolific source of contamination, for wells providing drinking water often received seepage from them—the cause of typhoid fever and cholera epidemics. Gradually, cities installed sewers. In recent times, sewage-reduction plants have been established that break down the chemical compounds, producing fertilizer. London built a sewer system in 1865, and other English cities followed its example. In the United States, where small villages were rapidly evolving into industrial cities, elaborate water and sewer systems were established. Finally, American inventive ingenuity produced the most efficient plumbing ever devised. By 1900 the United States government had granted over 3,500 patents for water closets and about 900 for sewage devices.

Hospitals and Nursing. An indispensable part of modern medical service is the hospital. Hospitals indeed existed in ancient days, especially in Greek and Roman society. They increased even more rapidly in medieval times owing to the Christian stress on charity. The founding of hospitals became a Christian duty. Each town possessed one or more such institutions; there were lazar houses outside the gates and special hostels within the walls. Monasteries also served as hospitals. Some modern European cities still have their medieval hospitals—for example, St. Bartholomew's Hospital of London, founded in the twelfth century, and St. John's, which still serves the city of Bruges. As medieval hospitals were places where the sick and weary were cared for, they should really be called hospices. Not until the nineteenth century were hospitals, in the modern sense of the word, established. The rapid growth of medical science necessitated lying-in rooms, sick wards, nurseries, and operating rooms. The hospitals of great cities are now commodious institutions provided with the latest medical equipment and capable of handling every type of disease and accident case.

Nursing, too, became a trained profession as medical science progressed. Nurses originally were nuns whose chief concern was the practice of charity, as, for example, the Sisters of Charity founded by St. Vincent de Paul (1576–1660), one of the most successful of nursing orders. The Beguines, a community founded in the Middle Ages, are still influential in the cities of Belgium. Of a later day are the Deaconesses of Germany, an organization founded in 1833 by Pastor Theodor

Fliedner and his wife Frederika, which established many branches throughout Germany.

Florence Nightingale (1820–1910) will be forever honored in the history of nursing. This woman of strong philanthropic feelings, imperious will, and practical ability was much influenced by the example of the Sisters of Charity and the Deaconesses of Germany. During the Crimean War (1854–1856) she was horrified by the condition of the army hospitals near Constantinople in which no less than half the patients died, and after much opposition she reorganized them. Such was her persistence that she finally reformed the hospital service of the British army in spite of official misunderstanding and opposition. After the war, she interested herself in sanitary work in India. In 1860, she founded a school for the training of nurses in St. Thomas's Hospital in London. Her writings were influential in establishing the modern ideals of nursing.

The Red Cross was created by a Swiss named Henry Durant, who visited the bloody field of Solferino (1859) immediately after the battle. The ground was strewn with the wounded, many of whom received no attention for days. Large numbers of these unfortunates might have been saved if there had been organized medical service. Durant aroused public sentiment and urgent reforms until, in 1864, an international congress met at Geneva. The Geneva Convention provided that nations should treat ambulances and hospitals, including equipment and personnel, as neutral. The flag of the Red Cross was to bear the Swiss colors in reverse, a red cross on a white field. Red Cross doctors, nurses, and other personnel were to be distinguished by an arm band with a red cross. In succeeding years, this organization, enlarged to succor all forms of human distress, has become a powerful international force.

Treatment of the Insane. The treatment of the mentally deranged is one of the sad chapters in history. Conditions in asylums were as revolting as those in hospitals and jails. Patients were chained and herded together without regard to the nature of their malady. The unfeeling public often visited them to be entertained. St. Mary of Bethlehem in London, popularly called "Bedlam," was one such institution, founded in the sixteenth century. The unfortunate inmates were abused, beaten, given bad food, imprisoned in dark cells, bled without mercy, and drugged freely.

Phillippe Pinel (1755–1826), a physician in charge of the asylum of Bicêtre in Paris, freed the patients from their chains and provided them with good food and sunlight. His gentle methods improved their condition, and his example was followed in hospitals in France and other countries. Dorothea Dix (1802–1887) reformed the methods in the United States. Outraged by the inhuman treatment accorded the insane, she collected statistics and presented them to the legislature of

Massachusetts in 1843. Her appeal was well received, and reforms followed. She visited every state in the eastern part of the United States, successfully initiating reforms and founding asylums. Later she went to Scotland, where her tactics met with similar results. She well deserves the contemporary description of her as "the most useful and distinguished woman that America has yet produced."

Prison Reform. Prison reform was immensely important from a medical as well as a moral point of view. At first, prisons were badly ventilated, overcrowded, and insanitary. Inmates were exposed to smallpox, typhus, and diphtheria. In the eighteenth century the problem had attracted attention; the pietistic spirit awakened by John and Charles Wesley roused the conscience of many. Among these was John Howard (1726–1790), a man of philanthropic feelings who generously spent his wealth and leisure in reforming English prisons. When on his way to Portugal in 1756, he was captured by a French war vessel and imprisoned. His first practical experience with prisons proved illuminating. On being released, he returned to his home in Cardington, where he initiated the building of model houses for workmen, elementary education for children, and industrial training for the villagers. Appointed sheriff of Bedford, he was outraged by the callous treatment accorded prisoners. He found that prisoners who had served their sentences were kept jailed indefinitely until they could pay their fees to the jailer.

Howard visited many jails and houses of correction and collected information that he presented before the House of Commons in 1774. Laws were passed to remedy the situation, but they proved ineffective. Howard persisted, however, visiting the prisons of England, Scotland, and Ireland; he also visited the Continent and found the houses of correction in the Netherlands the most efficient and humane. In 1777, he published his report, *The State of the Prisons in England and Wales with Preliminary Observations and an Account of Some Foreign Prisons*, recommending that institutions like those found in the Netherlands be established. He also investigated lazar houses and for this purpose visited the institutions of southern Europe. It is said that Howard traveled 50,000 miles to study the prisons of nearly every state in Europe.

The career of Elizabeth Fry (1780–1845), a member of an old Quaker family, also is famous in the philanthropic medical history of the nineteenth century. She began working among prisoners in 1813. Turning her attention to Newgate, a prison in London, where conditions were appalling, she found 300 women and children crowded together in two yards and two small rooms. Some were charged with serious offenses, others with slight ones; some had loathsome diseases. They slept on floors without bedclothes and cooked their food and washed themselves

and their clothes in these narrow quarters. She organized food and clothing relief, but her greatest influence was personal; prisoners gladly listened to her moral appeals. Wherever she went, the morale of the inmates was bettered. Her efforts provoked deep interest, and the conditions prevailing in prisons were much improved as a result of her unselfish labors.

Modern medical science has given man an enormous advantage in his struggle against disease. Today we are largely able to control nature through science; blighting "acts of God" have been averted or remedied by the acts of men. Our knowledge of disease, its cause, control, and prevention, has wiped out much of human suffering. An awakened public conscience is providing more adequate institutions—hospitals, asylums, and prisons—for the control of crime and relief of suffering. More and more men and women are organized to alleviate misery, remedy misfortune, and reduce suffering. With the help of medical knowledge, we can battle effectively against disease, increase the span of life, and make existence more pleasant. Without medicine in all its branches, modern society would scarcely be able to function.

FOR FURTHER READING

Buck, A. H.: *The Growth of Medicine from Earlier Times to about* 1800
Castiglioni, Arturo: *A History of Medicine*
De Kruif, Paul: *Microbe Hunters*
———: *The Fight for Life*
Dock, L. L., and I. M. Stewart: *A Short History of Nursing*
Duclaux, Emile: *Pasteur, The History of a Mind*
Garrison, F. H.: *An Introduction to the History of Medicine*
Glendening, Logan: *Behind the Doctor*
Graham, Harvey: *The Story of Surgery*
Haggard, H. W.: *Devils, Drugs, and Doctors*
———: *The Doctor in History*
———: *The Lame, the Halt, and the Blind*
Hale-White, William: *Great Doctors of the Nineteenth Century*
Hemmeter, J. C.: *Master Minds in Medicine*
Hunter, Richard: *A Short History of Anatomy*
Lambert, S. W., and G. M. Goodwin: *Medical Leaders from Hippocrates to Osler*
Lindsay, Lilian: *A Short History of Dentistry*
Miller, J. A. (ed.): *Milestones in Medicine*
Murray, R. H.: *Science and Scientists in the Nineteenth Century*
Newsholme, Arthur: *Evolution of Preventive Medicine*
Nutting, Adelaide, and L. L. Dock: *A History of Nursing*
Osler, William: *The Evolution of Modern Medicine*
Powers, D'Arcy: *A Short History of Surgery*
———: *British Masters of Medicine*

Chapter LI

SCIENTIFIC NATURALISM

In the latter half of the Victorian era we were confronted with a materialism according to which the basis of the universe of existence was matter; and thought, feeling, consciousness of every kind, merely a by-product or concomitant of certain material processes.—G. Dawes Hicks

FROM the phenomenal advances in science described in the foregoing chapters, we turn to the transformations wrought by them in the attitude toward life and all things pertaining to it. The predominant tone of the new conceptions that appeared after 1840 was materialistic. Viewed as the organization of material things on the basis of principles derived from the natural sciences, culture was considered little more than an incidental by-product of material forces. In the formulation of such views, ideas derived from physics, chemistry, and especially biology proved suggestive. To these new conceptions, we shall apply the term scientific naturalism, a metaphysical principle regarded as the basic foundation of life and culture.

Positivism: Auguste Comte. About 1840 a system of philosophic thought called Positivism appeared, inaugurated by Auguste Comte (1780–1857), a Frenchman influenced by thinkers of the Age of Reason. Skeptical of our capacity to know anything definite about final causes, Comte denied the validity of metaphysics. According to Comte, knowledge is limited to "positive" facts and to relations between facts. Positivist philosophy therefore confined itself to knowable facts and to discoverable relations between them. Scientific knowledge based upon observations and experiment was the only valid knowledge.

Comte believed that laws explaining all science could be established. His law of the three stages, referred to in a preceding chapter because it formed the basis of Comte's sociology, was a basic philosophic principle applicable to all knowledge. He believed that science developed historically in three stages: (1) the theological, or fictitious; (2) the metaphysical, or abstract; and (3) the "positive," or scientific. In the earliest stage, scientific phenomena were explained by the action of supernatural beings, or gods. There were three successive ways of explaining such phenomena—fetishism, polytheism, and monotheism. In the second stage, phenomena were accounted for by chemical or vital forces or by metaphysical principles. These two stages of growth, however, Comte considered obsolete. The third stage, the one in which phenomena

are explained by laws derived from the study of concrete facts and their relations, was the true explanation of the universe. These positive sciences, mathematics, astronomy, physics, chemistry, biology (which includes psychology), and sociology constituted the key, and Comte elaborated them in his monumental *Course of Lectures on Positivist Philosophy*.

Positivism proved immensely popular. Scientists found in its doctrines a ready justification for a purely naturalistic view of the universe. Realistic industrialists discovered more than a germ of optimism in the positivist doctrine of the finality of science. Both subscribed to its belief that the finding of facts was the most important business of man. Enthusiastic political leaders welcomed Comte's ideas because they seemed to reinforce the utilitarian and humanitarian philosophy of Jeremy Bentham. A new type of liberalism sprang up from these influences. As usual during the Industrial Age, English political thought led the Western world. John Stuart Mill (1806–1873), the most enthusiastic exponent of the newer intellectual tendencies, started as an advocate of Utilitarianism but under the influence of Comte's ideas began to study science, which he believed would provide the basis of social and political reform. The new liberalism insisted upon sweeping sociological changes by demanding the "emancipation of women," restriction of child labor, betterment of working conditions in mines and factories, extension of the franchise, nationalization of land, and other measures. When governments began to heed the demands of thinkers like John Stuart Mill, they entered upon the broad and easy path leading toward state socialism and by the close of the century had helped put an end to the laissez-faire theories that had guided national economy since the days of Adam Smith.

Humanitarianism, a characteristic feature of Positivism, curiously enough sprang from Comte's religious ideas. Comte had little patience with the concept of a supernatural God; in this respect, he followed in the footsteps of French rationalist philosophers. Like them he was strongly devoted to humanitarianism. But he became increasingly religious, his reading being limited to Dante's *Divine Comedy* and that classic of spiritual thought, *The Imitation of Christ*. He believed that humanity should be worshiped as well as studied scientifically. A new religion of humanity was actually created, and a few temples were opened. At the high altars, humanity was to be adored; at the side altars, eminent scientists, philosophers, and humanitarians were to be worshiped. Services were conducted by a hierarchy of priests chosen from the philosophers. Although the ritualism of the Catholic church was drawn on, positivist humanitarianism was a devitalized Catholic Christianity that failed to win a following.

EVOLUTIONARY MATERIALISM: HERBERT SPENCER. Evolutionary conceptions were coming to the fore, influencing not only scientific ideas but also philosophical opinion. Comte's Positivism showed this in a general way, but it was Herbert Spencer (1820–1903), an Englishman, who elaborated a comprehensive philosophy of evolutionary materialism. A practical man who educated himself, Spencer owed little to the conservative universities of Oxford and Cambridge. For a time, he was an engineer on the English railroads; his preparation as writer and popularizer of the new scientific ideas was gained in the school of hard work. An enthusiastic liberal, he read the new scientific literature and, in 1859, published a noteworthy essay, *Progress, Its Law and Cause*, the first effective statement of the optimistic revolutionary materialism. "Endless facts," he declared, "go to show that every kind of progress is from the homogeneous to the heterogeneous; and that it is so because each change is followed by many changes." This, he asserted, is the "law and cause of all progress that is known to us."

Spencer was an ardent supporter of Darwin's ideas presented in *The Origin of Species* (1859). To Darwin's words "struggle for existence," Spencer added "survival of the fittest." But he applied the concept of evolution to everything—material, biological, and cultural. Evolution is an integral matter, a principle controlling all things. "Should the nebular hypothesis ever be established, then it will become manifest that the universe at large, like every organism, was once homogeneous; that as a whole, and in every detail, it has unceasingly advanced toward greater heterogeneity; and that its heterogeneity is still increasing." To Spencer, this evolutionary process is essentially materialistic. He admitted the necessity of a Final Cause but declared that nothing "positive" could be known about such a Cause. He called it the "Unknowable," holding that in their speculations philosophers should disregard it.

Beginning in 1860, Spencer published his *Programme of a System of Synthetic Philosophy* in ten volumes. The first volume, bearing the special title *First Principles*, set forth the general conditions of knowledge concerning the Unknowable and the laws of the Knowable. In *Principles of Biology*, he accepted the biological theories of Darwin, giving them a materialistic color. *Principles of Psychology* endeavored to explain adult mental activity as the evolutionary product of its childhood and its distant animal ancestry. *Principles of Sociology* showed that society is a living organism analogous to biological organisms. Spencer believed that social organization began with the worship of ancestral ghosts, a doctrine known as *manism*. Society evolved under the pressure of the struggle for existence; only the fittest forms survived. He asserted that competition in industrial society exemplifies the biological theories of Darwin. In *Principles of Ethics* (1891, 1892) comprising the last

two of the ten volumes of the *System of Synthetic Philosophy*, Spencer propounded the optimistic and simple theory that the moral sense of human beings evolves and constantly becomes more powerful. Present selfishness and altruism will evolve into a harmonious social condition in which the greatest possible measure of human happiness will be achieved.

These ideas, borrowed from Comte, Darwin, Bentham, and others, proved popular in England and America. They formed a universal dogma of "progress," a theory of the history of civilization questioned by only a few. The following, written in 1885 by one of Spencer's followers, is an eloquent example of this optimistic and self-operating evolutionary materialism:

> The progress of civilization figures merely as one illustration more of a law that has necessitated alike the foundation of solar systems from misty nebulae; of mountain and river and meadow from the original murky incandescent ball of earth; and of the bright and infinite variety of animal and vegetable forms from a few primitive simple germs; the great law of evolution whereby all things which exist must pass from the simple to the multiform, from the incoherent to the coherent, from the indefinite to the definite; the law which, while determining not only that the egg with its simple uniform composition shall gradually unfold itself into the chick with its complex coherent and definite system of functions and organs; that the worm "striving to be man, shall mount through all the spires of form"; determines also that human society itself, which starts from the condition in which each family wanders about alone and isolated, and each man is at once warrior, hunter, fisherman, toolmaker, and builder, shall pass through the nomadic stage in which several families are united in a kind of chieftainship, where the king is at once priest and judge, and the priest at once judge and king, and eventuate in those complex settled states of modern civilization where labor is carried to its minutest subdivision and every function finds its appropriate social organ.

Followers of Materialistic Evolution: Haeckel. Spencer's thought also attracted wide attention on the continent of Europe. Materialistic philosophy guided ideas everywhere. It taught that the physical world and its forms, including man, are mechanical things, the universe and each of its parts being the product of a self-operating evolution. One writer who held such views was Ludwig Büchner (1824–1899), lecturer on medicine at the University of Tübingen. His *Force and Matter, or Principles of the Natural Order of the Universe*, stated that only matter exists. "No force without matter—no matter without force," was his motto.

> It is enough to remark of the changes and cycles through which matter passes in the universe, and which man has partly followed by balance and measure rod, millionfold, that they are without end and limit. Dissolution and generation,

destruction and re-formation clasp hands everywhere in an endless circle. In the bread we eat, in the air we breathe, we draw in the matter that once built up the bodies of our forefathers; nay, we ourselves give every day a portion of the matter forming our bodies to the outside world and shortly after we retake this substance or matter similarly given off by our neighbors.

It is evident that Büchner interpreted Darwin's scientific theories in an extremely mechanical and materialistic sense.

Ernst Haeckel (1834–1919) also was an uncompromising supporter of materialistic evolution. He was a professor at the University of Jena, and his work received wide recognition. His *General Morphology*, published in 1866, attempted to apply in detail the Darwinian theory of evolution to biology. This was but the beginning of a vigorous career. In 1898, Haeckel boldly published a genealogical tree of man's ancestors in which his antecedents were traced through twenty-six stages from the simplest and earliest protoplasmic forms to Java man. This tree aroused much comment. Some scientists supported Haeckel; others, however, were doubtful that any such detailed table could be drawn up on the basis of existing data. Like Büchner, Haeckel believed that matter and spirit are aspects of one and the same thing. With Spencer he believed that all things exhibit an evolutionary trend. So strongly did he dislike the idea of a Final Cause that in his *Riddle of the Universe* (1899) he advocated the discredited theory of abiogenesis. In this work, the chapters devoted to the biological sciences are the best; when the author traces the "evolution" of culture, he presents the subject most inadequately.

Pragmatism: William James. Pragmatism was another type of philosophic thought that developed during the nineteenth century. Comte thought that metaphysicians were little better than spinners of words. Spencer had a similar disregard for metaphysics. This mistrust was due in part to the success that attended the study of science, physical and biological. Scientific methods of study naturally are very different from those of metaphysics. Another reason for the mistrust of metaphysics was the exaggerations of Hegel and his followers. To serious thinkers, it thus seemed that metaphysics was bankrupt. So also believed the pragmatists, chief of whom was William James (1842–1910), a professor of philosophy at Harvard University, noted author of *Pragmatism*, *The Will to Believe, and Other Essays in Popular Philosophy*, and *The Varieties of Religious Experience*. Pragmatist philosophy holds that the original meaning of the universe cannot be discovered and that there is no use inquiring after its Final Cause. Further, it holds that man is the product of evolutionary forces. (1) It teaches that all our processes of knowing are bound up with the evolutionary process. They have a definite relation to the struggle for existence and the survival of the fittest.

All thought is for a purpose in this struggle—to maintain and guarantee existence. It is dominated by special interests, bias, emotion, and other feelings. (2) Further, this being the nature of thought, all knowledge exists only with reference to purpose. "Pure thought" is a figment. Such absolute ideas as "truth," "error," and "reality" are fallacious. (3) Hence, pragmatists assert that the truth of ideas is purely relative to the interests which have brought them forth. "Every truth has practical consequences, and these are the test of its truth." Like Positivism and Spencer's evolutionary materialism, pragmatism appealed to men brought up in the practical environment of the Industrial Age, under the influence of democratic ideals and the rapidly developing physical and biological sciences.

Psychological Theory. Meanwhile, psychology, for years regarded as a branch of philosophy, evolved as a special study. Concerned chiefly with metaphysical concepts, its method was essentially introspective. When scientists and philosophers turned against the subtleties of Hegel and his followers, some scholars began to study psychology as a branch of physiology. One of the first to do this was Wilhelm Wundt (1832–1920), a physiologist, philosopher, and professor at the University of Leipzig. His basic work, *Studies on the Theory of Sense Perceptions*, published in 1863, declared that the "soul" is not an entity separate from the bodily complex of muscles, nerves, and brain tissues, but rather a mechanical result of bodily actions. His *Outlines of Psychology*, produced in 1874, presents the physiological basis of mental activity, the relation of human to animal psychology, and the experimental methods to be followed. Wundt established the first psychological laboratory in 1875; from that date, psychology rapidly came to be regarded as a "science" in which mental phenomena were measured under laboratory conditions.

The impulse given by Wundt to experimental and animal psychology was continued by Ivan Pavlov (1849–1936), a Russian physiologist. His most famous experiment gave rise to the theory of conditioned reflexes, the importance of which is evident. Materialist philosophers and scientists had found it difficult to explain how simple stimuli could produce the most diverse responses. Pavlov's theories were further evolved in America by John Watson (*b.* 1878), a professor at Johns Hopkins University. A type of psychology known as "behaviorism" resulted. Insisting upon a rigid experimental method, Watson believed it necessary to assume that consciousness, cognition, perception, and will for the sake of the experiment be regarded as nonexistent. Man is a mechanical thing; psychology is concerned only with the measurable physical responses of the human machine to physical stimuli. Behaviorist psychology became extremely popular in America after 1918.

Applications of Psychology. When psychology became a branch of physical science related to physiology, the question of its practical value was raised. Studies began to appear in child psychology, abnormal psychology, and social psychology. An effort was made to measure the intelligence of school children and others, particularly the inmates of hospitals and prisons. Alfred Binet (1857–1911), a Frenchman and director of the psychological laboratory of the Sorbonne, evolved tests that in 1904 were used to measure the intelligence of defective children in French schools. "Intelligence tests" and "aptitude tests," under the influence of behaviorist psychology, acquired a vogue in the United States shortly after the First World War. They have been shown to be useful in indicating roughly the ability of students.

Cesare Lombroso (1836–1909), an Italian and a professor of medicine and criminal anthropology at the University of Turin, applied currently held biological ideas to crime. He argued that a person guilty of a criminal act is compelled by biological conditions and does not act from free choice. He is a degenerate because he has slipped back along the evolutionary track and so occupies a position "halfway between the savage and the lunatic." This idea that crime and insanity are due to disease alone has received little support even among the most convinced believers in a mechanical and evolutionary materialistic biology. Lombroso's work nevertheless advanced mental pathology, commonly called psychiatry.

Psychiatry and Psychoanalysis: Freud. The scientific study of mental disorders had never been properly emphasized until the end of the nineteenth century. But a new day dawned in the treatment of the mentally affected. Important in its influence on the treatment of mental cases was the work of an American, Clifford W. Beers, who wrote *A Mind That Found Itself* (1908). Suffering from a mental ailment, he went to a hospital for treatment. Upon recovery, he remembered the history of his case and was able to show in what way the treatment had been defective. His criticism opened a new field of research and treatment in mental diseases that was to revolutionize the science of neurology.

Sigmund Freud (1856–1938), an Austrian medical scholar, set up a new school of thought called psychoanalysis. He believed that the mind is only to a small extent conscious; the "unconscious" is the most important part of our mental processes, the wellspring of our wishes, thoughts, and beliefs. Among the more powerful unconscious "urges" is the sexual, which is primitive, passionate, and selfish. These unconscious urges conflict with the conscious, which represses them because of social, moral, religious, and other restraints. When unconscious desires suffer from "repression," they form a morbid sea of thwarted desires

called a "complex." By probing into the secrets of the unconscious, psychoanalysts believe they can produce a "release" for these repressions.

A decided reaction against the dogmas of Freud has recently been in evidence. It is as a theory of civilization that psychoanalysis may be attacked most seriously. While Freud has denied that he regards sex as the basis of civilization—a theory that has received the name "pansexualism"—nevertheless, the statements of psychoanalysts including Freud himself have given color to the accusation. Freud's *Totem and Taboo*, a book condemned by anthropologists, tries to explain anthropologically how our moral conceptions arose through sex factors. *The Future of an Illusion* tries to trace the origin of religion to our desire for a heavenly Father to take the place of an earthly father. In fact, all intellectual activity is explained in terms of personal desires, according to Freud's *Civilization and Its Discontents*. These theories of the psychoanalysts are based upon current materialistic tendencies in biological study and the growing skepticism regarding the finality of reason.

Gestalt Psychology. The human brain and its associated mechanisms and activities constitute perhaps the most complicated phenomenon in existence. Psychological theories, no matter how well they seem to fit the facts of psychical life, are bound to be revised and to succeed each other in rapid succession. A number of Germans, the most prominent being Max Wertheimer, from 1912 onward developed a theory of psychology called "Gestalt," meaning "shape" or "form." Behavior, they argued, cannot be reduced to a mere train of conditioned reflexes. To have meaning, an act must spring from some shape or form concept not associated with conditioned reflexes. For example, in listening to a symphony we hear not only a succession of tones but also a distinct melody. Dissatisfied with the extreme views of the behaviorists, adherents of Gestalt psychology have exerted a wholesome influence on psychological study.

Changes in Scientific Thought. By 1890, it became apparent to many that too much emphasis had been placed on Darwinism. If man was the product of an impersonal evolutionary materialism, life seemed meaningless. There followed a revolt against science conceived of as the study of rigidly mechanical forces of which life was the product and to which every manifestation of it was subordinated. The revolt was further encouraged by new conceptions of matter developed in the physical sciences. The discovery of radioactivity and the X ray, the isolation of radium, revolutionary modifications in the atomic theory due to the discovery of electrons and protons by Joseph Thomson and Ernest Rutherford, the epochal discoveries in chemistry of Henry Moseley, and the novel conception of relativity marked a new era. The old dogmas of

materialism upheld by scientists like Ludwig Büchner began to seem untenable.

PHILOSOPHY OF PESSIMISM: SCHOPENHAUER AND NIETZSCHE. Pessimism was a reaction against harsh materialism. Every age is likely to have its pessimist philosophy. The Romantic Age, long before the materialistic thought of the nineteenth century set in, produced an exponent of pessimistic conceptions—the German philosopher Arthur Schopenhauer (1788–1860). He traveled widely and was well grounded in the science and learning of his day. His background, which was not a well-ordered one—his parents quarreled and his father committed suicide—undoubtedly colored his views. While Schopenhauer studied all philosophical systems including those of the Hindus, his thought is a rationalization of his own experiences, a protest against the optimism of the Age of Reason and the romantic optimism of his contemporaries.

Schopenhauer's philosophy is contained in *The World Conceived as Will and Idea*. The basic element in the universe is an urge to live called "will." Will, and not intellect, creates the world; it drives the animal world, including man, to act. Human reason is of slight importance as compared with will. The world is not a perfect place; on the contrary, it is really the worst of places, in which animals prey on animals and life's pains outweigh its pleasures. History is an endless series of wars, murders, violent acts, lies, and intrigues. Since reason ranks below will as a guiding principle, philosophers, religious men, poets, scientists, and artists suffer bitterly. The keener the intelligence and the nobler the character, the greater the suffering. The individualistic will-to-live-and-to-enjoy rules everything. There is no place for church, state, family, or philanthropic organization.

Life is evil; to escape is difficult. Several solutions were contemplated by Schopenhauer; one was suicide, another ascetic flight. But Schopenhauer, shrinking from strenuous self-denial, adopted an aesthetic attitude. Through the worship of beauty, he sought to build up an ideal world of fancy and art to insulate himself from the world's brutalities. Schopenhauer's influence was extensive. Nietzsche, for example, drew his first philosophic ideas from Schopenhauer's works (see below). Writers who adopt an aesthetic view shorn of moral conceptions usually owe their inspiration directly or indirectly to Schopenhauer and Nietzsche.

Friedrich Nietzsche (1844–1900), a German among whose ancestors on both sides were numerous clergymen, adopted similar views. At first, Nietzsche studied Greek thought, especially as it was revealed in the tragedians. When he absorbed the extreme materialistic philosophy with its hatred of Christianity, he attacked current ideas in religion, art, literature, and philosophy. Denouncing Jesus bitterly, he deprecated the morality of the Christian religion. Nietzsche's ideas were

expounded in a number of books of which his brilliantly written *Thus Spake Zarathustra* is the most famous. Following Schopenhauer, he thought of the universe as composed of matter, which, he asserted, we experience as "impulse," or will. Will strives for mastery. "This world is the will to power and nothing else." The universe in process of evolution has no Final Cause, no purpose, no end toward which it moves; it is a great tragedy. Placed in a world so constituted, man must express himself to the fullest. Gentleness, charity, generosity, sacrifice—ideals inculcated by Christianity—have no reason for existence. The only real instinct is the will to power. The person who follows its dictates is not turned aside by morality, religion, or conventional ideas of right and wrong but tramples upon any demands for justice and shows no sympathy for the weak. Such a person, a "superman," will be one of an aristocracy of supermen who will live in a nonmoral universe. The common herd of weaklings, however, will have to lead dull lives governed by stupid moral conventions.

Such ideas were not understood at the moment they were published. However, as the difficulties of life have since been aggravated, especially by the First World War (1914–1918), and the optimistic ideals of the 1890's seem impossible of fulfillment, Nietzsche's pessimism has grown popular.

Vitalism and the Revival of Scholastic Philosophy. Henri Bergson (*d.* 1941), a Frenchman, published his *Creative Evolution* in 1907. His philosophical thinking is associated with rebellion against the mechanical and materialistic determinism that held all thought as in a vise. Bergson regarded matter, out of which the universe is created as a perpetual "vital stream," or *élan vital.* It possesses a vital force like consciousness and is instinctive and intuitive, not rational. The universe, or *élan vital,* is unceasingly changing; it flows ever onward in an evolutionary manner; human beings are part and parcel of this dynamic flux. The intellect has evolved through numberless ages purely for practical purposes and is not capable of grasping or proving a Final Cause. It can form only instinctive ideas. Logic, physics, and metaphysics as objective aspects of things are ruled out. The *élan vital* is constantly modified by temporary and immediate causes as the evolutionary process goes forward.

The philosophy of pessimism and the vitalism expounded by Bergson were not the only philosophical conceptions, however, that arose in protest against the rigidity of materialistic systems. To the amazement of many—especially the materialistic evolutionists—scholastic philosophy, which many fancied was securely buried, rose to life once more. Many a jibe had been leveled at it; for centuries, thinkers, whether competent or incompetent, referred to it as a bundle of arid stupidities. Nevertheless,

scholastic philosophy as expounded by Thomas Aquinas had its advocates. Scholasticism still was a vital system even though it had been buried beneath the avalanche of modern doctrines, beginning with those of Descartes. When interest in the civilization of the Middle Ages began to revive early in the nineteenth century, some scholars turned their attention to the thought of that time and discovered in it a basis for faith in reason denied by much current thought.

The first steps in reviving scholastic philosophy were taken in Italy, naturally in Catholic circles. Before his elevation to the Chair of St. Peter in 1878, Leo XIII, Pope from 1878 to 1903, was deeply interested in the philosophy of Thomas Aquinas. As Pope, he was in a position to insist upon its being studied in seminaries and colleges. He issued the encyclical *Aeterni patris* (1879), which explained the virtues of scholastic methods. In 1891 the Institute of Philosophy opened at the University of Louvain. Great energy was displayed in adapting scholastic philosophy to modern knowledge. Its strongest aspect was its metaphysics; it had much to give an age that ignored or travestied this subject. Its weakest aspect was ignorance of the facts and principles of modern experimental science. To remedy this defect was a herculean task, but it could be accomplished. Another problem was to take scholastic philosophy out of its medieval dress and make it understandable to modern students. Success crowned the efforts of such eminent philosophers as Maurice de Wulf and Etienne Gilson; today their views have to be reckoned with.

Catholic Revival in France. Closely as the philosophical schools described above were related to the moving forces behind the civilization of the nineteenth century, the history of Christianity in some respects reflects them even more clearly. The French Revolution marked the close of a disastrous period in the history of Christian churches, whether Catholic or Protestant. For several generations, rationalist thought had sapped the zeal and efficiency of churchmen. The philosophy of deism, which taught that God, the original cause, did not influence the universe after he had set it in motion, robbed prayer of its efficacy and seemed to destroy the possibility of confident trust in God. Fundamental doctrines such as the divinity of Jesus, the Resurrection, and the efficacy of the sacraments were questioned. Church discipline weakened visibly. It no longer was fashionable for intellectuals to be Christians.

The Romantic movement, however, changed all this. Just as it started a revolt against the poetry, prose, art, and philosophy of the eighteenth century, it also caused a rebellion against rationalist and deist religious conceptions. A number of leaders in France took up the cudgels for the Catholic faith. Joseph de Maistre (1735–1821) argued that France had misused the gifts received from God by fostering philosophers like Voltaire; the Reign of Terror was a divine punishment. Religion rests

upon the authority of an infallible Pope as head of the church. These ideas De Maistre elaborated in his remarkable *On the Pope*, which appeared in 1819. Similar in many respects were the ideas of Félicité Robert de Lamennais (1782–1854), a Frenchman who in 1817 produced *An Essay on Indifference in Religion*. He argued that there exists only one true faith, the Catholic, submission to which is necessary for salvation.

Far more influential than De Maistre and Lammenais was François René de Chateaubriand (1768–1848) He had imbibed the ideas of Rousseau and the rationalist philosophers but, profoundly moved by the death of his mother, turned to Christianity for solace. "I wept and I believed," he said. In the past, he had attacked the Christian faith but now defended it in his *Genius of Christianity* in 1802. Defying rationalist philosophy, he held that the derided faith was the most beautiful of religions and had exercised a formidable influence in the growth of civilization.

> It was not the sophists who had to be reconciled to religion; it was the world whom they had led astray. They had induced it to say that Christianity was a form of worship born in the bosom of barbarism, absurd in its dogmas, ridiculous in its ceremonies, the enemy of arts and letters, of reason and of beauty; a form of worship which had never accomplished anything but to shed blood, enchain men, and hamper the happiness and wisdom of the human race. Therefore we must seek to prove on the contrary that of all religions which have ever existed the Christian faith is the most poetic, the most humane, the most favorable to the arts and letters; that the world of today owes everything to it from agriculture to the abstract sciences, from hospitals for the sick to the temples built by Michelangelo and adorned by Raphael. We must show that nothing is more divine than its moral principles; nothing more lovely and more stately than its dogmas, its teachings, and its form of worship. We must show that it favors genius, purifies taste, develops virtuous feelings, gives vigor to thought, helps writers produce elevated style, and provides perfect molds for artists; that it is no disgrace to believe what Newton and Bossuet, Pascal and Racine have believed; and that finally we should invoke all the charms of the imagination and all the interests of the heart to the support of the very religion against which they have armed them.

The Genius of Christianity presented a survey of the doctrine and history of the church, devoting whole chapters to aspects of its activities such as music, sculpture, painting, architecture, philosophy, history, ceremonies, missions, monasteries, hospitals, education, agriculture, commerce, law, and government. Far from showing the hostility of writers like Voltaire, this book is imbued with sympathy for an institution that had guided mankind for hundreds of years. Chateaubriand's appreciation of religious culture was perhaps excessively aesthetic. His admirers, however, began to study history from the standpoint of social and religious life. Thus *The Genius of Christianity* marked the beginning not only of

the revival of religious faith but of a sound appreciation of the significance of the Middle Ages.

THE OXFORD MOVEMENT. The vigorous assertion of faith described above was not limited to the Catholic world, however. A similar revival, known as the Oxford movement, began in the Anglican church. This church had retained many Catholic features in spite of Protestant innovations brought in during the Reformation. By 1830 the Protestant Wesleyan revival, which began in the preceding century, had spent its force, and the new movement emanating from Oxford was a protest against sterile formalism. From the beginning, it emphasized the Catholic features of the church. Among its first leaders was John Keble (1792–1866), a poet whose *Christian Year* became a favorite volume of religious verse.

John Henry Newman (1801–1890) was the soul of the Oxford movement. Born in London and educated at Oxford, he became a clergyman in the Anglican church. In youth he had read the romances of Scott, which stimulated his interest in the Middle Ages. Edward Pusey (1802–1882), known for his translation of St. Augustine's *City of God*, encouraged Newman in his religious feelings. Fearing the growing influence of rationalists, the two men began to write the *Tracts for the Times*. Thus began tractarianism, the formulation of the doctrines of the Oxford movement.

Preaching to the students of Oxford, Newman shaped their religious thinking. More and more it dawned upon him that the Anglican church had been too subservient to the state and that it had not asserted its spiritual authority because the king was declared to be its head. His studies led him to believe that the Pope had always possessed supreme authority in matters of faith. Moreover, individual and subjective judgment as to the meaning of the Bible had wrought havoc with the unity of Christendom. These difficulties, Newman thought, were avoided in the Catholic church, whose authority had come unimpaired from Christ and the apostles.

In 1845, Newman joined the Catholic church, followed by a group of friends and admirers. This created a stir and gained him the enmity of many; but he replied to their accusations in a series of effective writings. His *Development of Christian Doctrine* presented a view of the growth of the early church. The *Apologia pro vita sua* was a justification for abandoning the Anglican church, and his *Grammar of Assent* set forth the basis of religious faith. Newman was a powerful personality and wrote in a clear and convincing way. In 1878, he became a cardinal, and with him began the revival of the Catholic faith in England.

PROTESTANT REVIVAL. A revival similar to that of Catholicism, described above, occurred in the various Protestant groups. The teach-

ings of Luther and Calvin had very generally been abandoned under the influence of rationalism. Vital conceptions such as sin, grace, and forgiveness were ignored. The state-supported churches of Germany, Switzerland, the Netherlands, and Scandinavia and their politically approved clergy exercised little influence. It was assumed that there was no real basis for religion either in thought or conduct.

A leader opposed to the formalism of the spiritless religious life everywhere in evidence appeared in Friedrich Schleiermacher (1768–1834), a German who had come under the influence of the pietistic Moravian Brethren, the same who earlier had inspired John Wesley. Schleiermacher, however, believed that although religion is a genuine and necessary element of life it is essentially an intuition and not knowledge. The basic psychological experience he held to be the same in all religions. The form it takes depends upon conditions. Religion modifies conduct and shapes culture. His followers stressed the psychology and the history of religions. It is apparent that Schleiermacher's conceptions were very different from those of former thinkers, who had held that the truths of religion are as unchanging as those of geometry. Schleiermacher formulated his ideas in *Concerning Religion, Addresses to the Cultured among Those Who Despise It* (1799). This book, one of the most influential of modern times, helped to instil a new interest in religion among Protestant groups.

The spirit of revival also moved the American people. In the original thirteen colonies there had been a great variety of religions. Nearly every colony had passed laws establishing as a state religion some form of Protestantism, had placed disabilities upon religious minorities, or in some cases had even forbidden certain forms of faith. During the Revolutionary War an extensive movement in favor of disestablishment and general tolerance swept the thirteen colonies, so that when they gained their independence religious freedom became a feature of the new government as provided by the Constitution of the United States.

In general, the colonial churches reflected the religious conditions of Europe created by the Reformation. Large groups such as the Anglicans, Lutherans, Presbyterians, and Reformed were organized at an early date. By their side appeared smaller and more or less oppressed groups, like the Quakers, Mennonites, Baptists, Congregationalists, Dunkers, and Unitarians. The Catholics were limited almost entirely to Maryland.

After the Revolutionary War immigrant pioneers carried these faiths into the wilds west of the Blue Ridge and Alleghany Mountains. For the men and women living in the green forests of the frontier, isolated from the advanced centers of culture and exhausted by clearing the woods and breaking the prairie, religion tended to be emotional. Revival camp meetings were common; the more enthusiastic denominations greatly

increased their membership. By the side of the older bodies appeared new groups like the Methodists, Campbellites (Disciples of Christ), Adventists, Mormons, and Spiritualists, later to be augmented by the Christian Scientists and several smaller sects, all of which illustrated the general Protestant tendency of splitting into factions.

More significant in the long run probably was the great increase of the Catholics. Immigration from Ireland, Belgium, Germany, Italy, Poland, and other Slavic countries soon raised the Roman Catholic Church to first place, at least in the number of communicants. Many Catholics settled in the rapidly growing industrial areas, thus converting them into predominantly Catholic centers, as in the case of Boston, which a century ago was a Protestant city. Besides the Roman Catholics, toward the close of the nineteenth century appeared immigrants of the Orthodox faith—Greek, Bulgarian, Serbian, and Russian. From the standpoint of religion, therefore, the character of the American population has changed significantly since the Revolutionary War.

Protestant and Catholic Institutions and Associations. Institutions of education, charity, and good will—products of the religious idealism of the nineteenth century—spread over England and the United States. The Sunday school is a typical example. Children who labored long hours in the factories of England were neglected from a religious and intellectual point of view. Robert Raikes (1735–1811), a printer and a man of generous sympathies, was perturbed by their plight. He believed that the unruliness of factory workers was due to a lack of religious instruction and, as a consequence, organized a Sunday school in 1780 that afforded child factory workers some religious education. His example was admired by John Wesley; gradually, Sunday schools were organized in most of the Protestant churches of England and the United States. The Sunday school became an important educational institution, providing instruction in religion and distributing edifying literature.

The Young Men's Christian Association, founded in 1844 by Sir George Williams (1821–1905), grew out of the religious meetings of men engaged in the dry-goods business. Its activities included religious instruction, Bible reading, maintaining living places for young men, and providing education and entertainment. The Y.M.C.A. spread throughout England, but its greatest development occurred in the United States. The Young Women's Christian Association, organized in 1877, had similar objects in view, and, like the Y.M.C.A., met with a favorable reception. The Salvation Army was organized in 1880 by William Booth (1829–1912) to work in the slums. Its methods were somewhat spectacular—street preaching, band music, and a semimilitary organization—but it effectively reached the lower elements in the large cities.

Even more than Protestants, Catholics realized the necessity of special associations for the inculcation of social, political, intellectual, artistic, and religious ideals. Organizations composed of laymen were founded and multiplied rapidly. They embraced all classes of the population from peasants and industrial workers to professional men. The Catholic youth organizations adopted certain features of the Boy Scouts. The Society of St. Vincent de Paul, founded in 1833, carried on extensive poor relief in all the larger cities of the United States and Europe. The Flemish Boerenbond, or Peasants' Union, provided religious, intellectual, and economic education. Since the First World War a number of special societies have sprung into existence, owing to Pope Pius XI's insistence upon vigorous Catholic action. Most remarkable of these are the Catholic Grail in the Netherlands and the Jeunesse ouvrière chrétienne, or Young Christian Workers, of Belgium, France, and other countries, founded in 1919 by a Belgian priest, Joseph Cardyn. Its members are called "Jocists," after the initials in the name of their organization, which at the present moment numbers over 500,000. An English branch was founded in 1930. Such organizations have proved a decided moral stimulus in the confused economic, social, moral, and religious life of recent years.

Missionary Activities. Wherever Europeans went during the nineteenth century—Africa, America, Australia, Japan, China, India, and other Asiatic countries—they carried the church with them. The Catholic clergy showed great zeal in bringing the faith to the aborigines of South and Central America, Mexico, Canada, and the United States. Jesuits, Franciscans, Dominicans, and Capuchins also were engaged in such missionary enterprises. By their side appeared several new orders—the Brothers of the Christian Schools, who conducted schools, the Sisters of Charity, who worked among the unfortunates, and the Society of the Divine Word, which educated priests for missionary work and published the important anthropological journal *Anthropos*. The Catholic faith spread to all parts of the New World.

Meanwhile, missionaries of the Orthodox church, especially the Russian branch, labored with considerable success in Asia. Protestant bodies of England and the United States organized missionary societies. The field of their activities was almost as extensive as that of the Catholics. By 1910, there were about 41,000 Catholic missionary workers (priests, sisters, and lay brothers) in Africa, Oceania, and Asia. The Protestants at that time had about eighteen thousand missionaries. All groups established schools and colleges, and the Catholics greatly extended the hierarchy of bishops.

Factors Checking the Religious Revival. The educational and proselytizing activity described above was not so successful, however, in

multiplying the numbers of church members as might have been expected. By 1910 the number of Christians was estimated to be about 558,861,000, of whom 272,638,000 were Catholics, 120,157,000 Orthodox, and the rest Protestants. These figures suggest that religious bodies had not gained in the same ratio as the population. There was a constantly growing number of people who no longer went to church, a condition new in the history of Western civilization. What were the reasons for this? The first undoubtedly is to be found in the impact of industrialism. The development of factories in Europe tended to draw peasants and farmers to the cities. Leaving the villages where they had been born, they lost contact with old religious associations. Rapidly growing cities provided inadequately for the religious needs of the newcomers; having broken their institutional connections in the country, they failed to reestablish them in the city. A similar situation obtained in the United States, and with an added feature. Besides the farmer who moved into the city and gave up his church connections was the foreign immigrant who, finding himself in a strange land, no longer went to church. For example, Italian Catholics, unable to find a priest who could speak their language, fell away from the church.

A second factor in checking the growth of church membership was the power of liberalism after the French Revolution. Liberals were skeptical about the desirability of permitting the church to be the main inspiration of civilization and preferred to give the state a dominant role in guiding life. Opposed to the extensive power of the clergy in education, they insisted upon state schools in which there should be "neutral," that is, nonreligious, teaching. They campaigned for the "separation" of church and state, insisted that marriage is a civil contract, demanded legalization of state divorce, and wished to appropriate the properties of churches and monasteries, which in many countries, for example, Italy and Spain, were substantial. As a result of this demand for the secularization of land the Catholic church by 1900 had nearly everywhere, including Spain, lost the properties it had held for generations. In some cases, as in France, even church buildings were confiscated. Whatever property the church has acquired since such confiscation has been limited.

Another phenomenon that challenged the leadership of the churches was nationalism. Related to liberalism, the more extreme sentiment of nationalism ran counter to the claims of Catholic Christianity, which taught that God is the father of all men irrespective of race or nationality and that states as well as individuals must obey him. Nationalists were suspicious of the loyalty of citizens who belonged to a church organization embracing the entire world. Thus, Bismarck opposed the Catholic church in Germany because of its relations with the church outside

Germany. Protestant churches such as the Lutheran in Germany and Scandinavia, the Reformed in the Netherlands and Switzerland, and the Anglican in England, on the other hand, escaped the hostility of nationalists. However, this was a doubtful advantage; for, being state churches, they were so closely tied to state governments that political interests usually exerted too great an influence in religious matters.

A fourth group of difficulties sprang from the relations between religion and science. The rapid growth of the natural sciences profoundly modified the traditional views of life. It may be stated as a general principle that scientific truths, when properly understood, hardly touch the province of religion. But it was on the border line between the physical sciences and the social sciences that trouble arose and that there was a sharp "conflict between religion and science." In many instances the contestants were ill-informed, which produced intolerance. Some theologians attacked scientists without understanding the principles of the science they were attacking. Conversely, scientists often regarded religion as a discarded superstition.

The theory of evolution, interpreted as a mechanical, materialistic, and self-operating principle, disturbed many religious people. Spencer, Huxley, and Haeckel, who advocated such a conception, argued that man knew nothing positive about a Final Cause. Evolutionary conceptions implied that traditional teachings based upon a literal interpretation of the Book of Genesis were untenable. It appeared that the earth had not been created but that it was the result of a slow evolving process. All life was a struggle for existence; only the fittest survived. Ethics and morality were the product of evolution; religion was regarded as the result of an evolutionary process.

Higher Criticism: Renan. "Higher criticism," the scientific study of the early literary texts of Christianity, further undermined the faith of many. The advocates of higher criticism zealously applied its new methods. One of the pioneers among these was the German Protestant David Strauss (1808–1874), who had imbibed the thought of German romantic writers and philosophers such as Goethe, Herder, and Hegel. Toward religion he adopted a narrow view, lacking what we today would describe as "religious psychology." Nor did he have much sympathy for the study of cultural history, without which the isolated facts of the past appear strange and sometimes irrational. Strauss published his *Life of Jesus* in 1835, the product of long and patient study, in which the author came to the conclusion that the story of Jesus' life as told in the New Testament is a tissue of contradictory accounts. Jesus no doubt lived, but beyond a few facts it seemed that nothing was known about him. Strauss felt that the figure of the historical Jesus had been obscured

by the legends of the early church and that in this way arose the so-called "Christ myth."

Catholics also were troubled by higher criticism—through one who had forsaken their church. This was Ernest Renan (1823–1892), a Frenchman from Brittany. Educated for the priesthood, he renounced the faith in 1845. A man of extraordinary energy, his intellectual interests covered the whole range of human activity. He became acquainted with current German thought, especially that of Goethe, Herder, and Hegel, and studied the writings of Strauss and his followers. Renan conceived the idea that science should take the place of religion in the formation of culture as he felt that theology could not provide certain and vital truths. But he never took an actively hostile attitude toward traditional Christianity. He wrote, "I would praise it, exalt it, cover it with kisses, but humanize it."

Renan became professor of Hebrew in the Collège de France in Paris, traveled in Palestine, and wrote a number of significant books. His *Life of Jesus* is a literary masterpiece; it portrays Jesus as a Jewish prophet who preached the kingdom of God and denounced the worldliness and wickedness of Jewish leaders who later condemned him. According to Renan, Jesus was a human being who deceived himself in believing that his teaching was acceptable. Renan's *Origins of Christianity* depicted Christianity as the greatest single force in history but divested it of all supernatural elements, maintaining that it was the product of evolutionary forces.

The teachings of Renan and a host of followers produced what is known as "liberal theology." An immense amount of critical energy was expended upon the early history of the church, the comparative study of religions, and the psychology of religion. Liberal theology has contributed much new information and made possible a clearer scientific statement of problems connected with Christianity and the history of religion. Conservative, or traditional, groups, on the other hand, have likewise contributed much. Catholic scholarship, for example, has examined liberal studies and in turn stated the Catholic position in the light of modern scholarship (see below).

Catholic Reaction to Religious Liberalism. Owing to its traditions and organization, the Catholic church was peculiarly fitted to cope with liberalism. From the beginning, it had a corps of trained scholars. The principle of authority, always a feature peculiar to the Catholic faith, kept destructive higher criticism out of the seminaries, and the popes took an active lead in counteracting liberal theological opinion. Pius IX in 1864 issued a *Syllabus of Errors*, in which he condemned the liberal conception that the secular state should be divorced completely from the

church. He declared that the Christian community should exist by the side of the state, independently of the state, and encouraged and supported by the Christian community of the state. The *Syllabus* dealt with the chief errors of the day, condemning agnostics and freethinkers, naturalists and materialists, liberals and those who were indifferent, nationalists and anticlericals, for all these doubted the divine origin of the Christian religion, took a purely materialistic view of life, thought that all religions or creeds were equally good, or wished to place the church in a position subordinate to the State. Having thus stated the position of the church, the hierarchy was ready to resist modernism. On the other hand, liberals, who believed in "progress," argued that the Catholic church was an obscurantist institution and backward looking so far as the issues of civilization were concerned.

In 1870 the Vatican Council took a momentous step in defining the dogma of papal infallibility. The council was attended by about eight hundred delegate prelates from all parts of the world. These delegates together with the Pope spoke for the whole church. Its decree proclaimed that papal infallibility was a

> . . . dogma divinely revealed, that the Roman pontiff, when he speaks ex cathedra—that is, when, in discharge of the office of pastor and doctor of all Christians, he defines, by virtue of his supreme apostolic authority, a doctrine regarding faith and morals to be held by the universal church—is possessed, by the divine assistance promised him in Blessed Peter, of that infallibility with which the Divine Redeemer willed that his church should be endowed for defining faith or morals; and that therefore such definitions of the Roman pontiffs are per se immutable and independent of the consent of the church.

This seemed a bold declaration when liberals and modernists took it for granted that their private judgment on religious matters was as sound as that of the church.

Nevertheless, the papal position met with a response that surprised the modernists. Leo XIII, Pope from 1878 to 1903, succeeded Pius IX. He was an able pontiff, a profound scholar, and a tactful person. He assumed the truth of the historic doctrines of the church, condemned the materialistic philosophies that prevailed, and, as we have learned, sought to revive the study of scholastic philosophy. He encouraged the organization of schools and teaching orders and the creation of research groups and universities. Furthermore, he stimulated missionary work and strengthened the hierarchy by creating new bishoprics. The result of such an energetic policy was remarkable: the prestige of the Catholic church rose in spite of criticism from the liberal and modernist camps.

Pius X, Pope from 1903 to 1914, continued this struggle with modernism. Some laymen held that the church should "modernize" its

teachings so as to conform with the dogmas of liberals; and when a few clergymen showed signs of modernism, it appeared that the new conceptions might get a foothold in the seminaries. But Pius X adopted a resolute attitude; in 1907, he issued the encyclical *Pascendi gregis*, in which modernist points of view were condemned. Henceforth, all priests were required to take a special oath against modernism.

PROTESTANT REACTION TO RELIGIOUS LIBERALISM: FUNDAMENTALISM. Protestant churches as a whole were not nearly so successful as the Catholic church in combating modernism. Some like the Unitarian and Universalist absorbed every modernist doctrine about the nature of religion, the authority of the Bible, the mission of Jesus, and the meaning of the sacraments. Others like the Anglican, Presbyterian, Lutheran, and Reformed were able to ward off the modernist invasion for a while. But gradually some "advanced" thinkers found their way into theological seminaries and other influential posts, from which they carried on a vigorous teaching of new ideas. They won a great victory, for modernism involved even more radical changes in Christianity than any that had been introduced by the Reformation.

There was a group, however, who insisted upon the observance of ancient creeds. These people possessed a wealth of conviction and, seeking some principle of authority, fell back upon the teaching that the Bible was sole guide and authority in faith and morals. Clinging to the fundamentals, they were nicknamed "fundamentalists." They adhered to the literal meaning of the biblical text, questioning the bearing of the biological teaching of evolution on religion. An extreme example was the crusade of William Jennings Bryan against evolution. In their attitude toward science, such men were more zealous than informed and so failed to command the respect of the modernists. Their attitude proved unexpectedly powerful in some quarters, however, for example, in several states in the United States in which legislation was passed against the teaching of evolution in public schools.

Some Protestant denominations in Europe as well as in the United States have been able to check modernism. But the larger denominations have not been so successful; their constituencies frequently become sharply divided on the issue of such questions as the Virgin Birth, the divinity of Jesus, the Resurrection, and the nature of the Bible.

The struggle, however, is far from ended, and no man can possibly foretell what the outcome will be. One point seems certain: Religion, having always been a chief constructive force in the history of civilization, is likely to retain that force no matter what its guise. It appears that there is no power in Western civilization today which can uproot religion unless it is a communistic political organization like that of Soviet Russia or a totalitarian state like Nazi Germany. Whether belief in a super-

natural religion will survive depends upon the capacity of such a faith to satisfy the deepest human religious needs. It also depends upon the capacity of modernists, who have all too often and too exclusively based their teaching upon untenable scientific conceptions, to evolve a consistent concept of life that will satisfy the cravings of man for the strength and comfort that derive from certitude.

Scientific naturalism, accepted as gospel by thinkers during the nineteenth century, seemed to have run its course by about 1900. Bland optimism broke under the handicaps of an essentially materialistic philosophy. The resulting pessimism was reflected in philosophy and religion. But, curious as it may appear, this growing pessimism was based upon principles of physics, chemistry, and biology that scientific investigators were showing to be erroneous. Clearly, this confusion and diversity, observable in all branches of thought, indicate a far-reaching transition in philosophy and religion.

FOR FURTHER READING

ALEXANDER, A. B. D.: *The Shaping Forces of Modern Religious Thought*
ALLERS, RUDOLPH: *The Successful Error*
BARNES, H. E.: *The History of Western Civilization*, Vol. II
BEHN, SIEGFRIED: *The Eternal Magnet—A History of Philosophy*
BULGAKOV, GERGIUS: *The Orthodox Church*
CHAPMAN, J. A.: *An Introduction to Schleiermacher*
CORRIGAN, RAYMOND: *The Church in the Nineteenth Century*
DAWSON, CHRISTOPHER: *Progress and Religion*
———: *The Spirit of the Oxford Movement*
DRACHMANN, J. M.: *Studies in the Literature of Natural Science*
FIGGIS, J. N.: *The Will to Freedom*
HAYES, C. J. H.: *A Generation of Materialism*, 1871–1900
HUGHES, H. L.: *The Catholic Revival in Italy*, 1815–1915
JOAD, C. E. M.: *Guide to Modern Thought*
KEELER, SISTER JEROME: *Catholic Literary France*
MCGUIRE, P., and J. FITZSIMMONS: *A Guide to Catholic Action*
MAY, J. L.: *Cardinal Newman*
MOTT, L. F.: *Ernest Renan*
MOWAT, R. B.: *The Romantic Age*
PILLSBURY, W. B.: *The History of Psychology*
WINDLE, BERTRAM: *The Church and Its Relations with Science*

Chapter LII

RECENT TENDENCIES IN LITERATURE AND ART

Toleration is a herb of spontaneous growth in the soil of indifference; but the weed has none of the virtues of the medicinal plant reared by humility in the garden of zeal.—S. T. Coleridge

SCIENTIFIC naturalism, which dominated philosophical and, religious thought during the greater part of the nineteenth century also permeated every form of artistic expression, whether literature, painting, sculpture, or music. This spirit, known as "realism," appeared about 1850 and exercised a steadily growing influence.

Several reasons may be advanced for this tendency, the chief cause being the difficulties that cried for solution in social, economic, and political life. It will be recalled that, during the 1840's, times were hard, trade declined, the potato blight brought ruin, the proletariat was discontented, and agitations were rife. These problems exercised a sobering influence upon the roseate optimism of the Romantic Age. A second and more fundamental reason was the growth of scientific thought, which, predominantly materialistic in spirit, had an eye only for the so-called "real things" of life. In 1848, Marx published his *Communist Manifesto*, the Bible of socialism, which bore the materialistic imprint. Although Darwin did not adopt a rigidly materialistic point of view, his *Origin of Species* (1859) was hailed as supporting materialism. The works of Herbert Spencer provided a philosophy that seemed to establish the realistic movement on scientific ground.

The new spirit emphasized facts and showed a preference for the realities of material existence. Opposed to conventions and traditional views, writers and artists criticized art, morals, manners, and religion. The sociological novel appeared, emphasizing social, class, or family problems in terms of a more or less rigid economic determinism. Psychological analysis, an excellent method of showing the conflict between individuals and political, social, and economic institutions, became popular.

Traces of Romanticism in English Literature. At first, however, romantic writing remained popular in England as in other countries. Robert Louis Stevenson (1850–1894), for example, wrote such works as *Treasure Island*, *An Inland Voyage*, and *Travels with a Donkey*—romantic and possessed of irresistible charm. A similar idealism characterized the

work of Rudyard Kipling (1865–1936), who wrote jungle tales and stories of heroic adventure. Kipling was a patriot; his poetry and some of his tales reveal the admiration for imperialism that was widespread about 1890. His *Mandalay* and *Recessional* were popular in England as well as in other European countries that profited from their colonial connections.

Realism in English Literature. Thomas Hardy (1840–1928) is perhaps the most outstanding of modern English realistic novelists. He lived in south central England; the scenes of his novels are laid in the region around Salisbury. His philosophy is fatalistic, springing from the naturalism and materialism current after 1860. Couched in simple but powerful style, his novels depict human beings as playthings of malicious and uncontrollable forces. *Tess of the D'Urbervilles*, Hardy's masterpiece, is the story of a girl named Tess who, twice seduced, is never forgiven, suffers remorse, and commits suicide. *Jude the Obscure* is the story of a youth who wishes to make something of himself but is thwarted at every turn. Two women bring about his downfall. *The Return of the Native* relates the career of an English village lad who goes to Paris but returns in order to become a teacher in his native village. He marries Eustacia Vye; but, disappointed because he does not take her to Paris, she makes life miserable for him, finally becoming faithless. Hardy's novels portray the baser animal characteristics of men and women, unrelieved by idealism.

Since 1894, George Bernard Shaw has enjoyed an international reputation as a writer of plays, essays, novels, and letters. He is an iconoclast with a trenchant and brilliant style. No respecter of conventions, he reveals a tendency to shock readers. That he belongs to the realistic age is apparent from the topics treated in his plays. He has analyzed socialism, intolerance, the superman as Nietzsche viewed him, philanthropy, marriage, militarism, imperialism, feminism, and the Salvation Army. Among his best-known works are *Man and Superman*, *Saint Joan*, *Back to Methuselah*, *The Apple Cart*, and *The Intelligent Woman's Guide to Socialism and Capitalism*. He has posed as an aristocrat and a Socialist, not because he believes in class but because he likes to assume intellectual superiority. His audacious statements at first outraged people; but as the years went by, many of his ideas seemed anything but startling.

A younger contemporary of Shaw, H. G. Wells (*b.* 1866), evinces similar views. He was born into a poor family and worked hard for his education. With a love for science, he developed a materialistic point of view. Disliking the old aristocracy as well as the pretentious new wealthy class that had made its money in industry, he adopted and propagandized radical views on educational, political, social, marital, and ethical questions. His position as a literary figure is assured because of his ideas rather than his artistic skill. Wells's scientific romances include *The*

Time Machine, The Stolen Bacillus, The War of the Worlds, and *The First Men in the Moon;* they are interesting and instructive because they picture the effect that science and the machine age exert upon life and thought. His *Tono-Bungay* is the story of a fortune derived from a patent medicine. *Mr. Britling Sees It Through* describes the feelings of the average Englishman during the First World War.

One of Wells's favorite ideas is that socialism combined with the fullest exploitation of machinery would produce a social utopia. Religion, which in common with some other realists of the age he regards as "superstition," should be banished along with other "backward-looking" forces, and the reign of supermen would then begin. Similar views of a materialistic utopia are elucidated in *A Modern Utopia, The Research Magnificent,* and *The Shape of Things to Come.*

French Realistic Novelists. Realism appeared in French literature much earlier than in English. The first successful realistic novel was *Madame Bovary,* published by Gustave Flaubert (1821–1880) in 1856. There was, however, something of the romanticist in Flaubert. His sensitive nature was disgusted by the philistinism of village characters. *Madame Bovary* is the history of a sordid marriage contracted among such people. Charles Bovary, a dolt excessively under his wife's influence, is completely duped by her. Flaubert analyzes Emma Bovary's infidelities dispassionately. The novel was originally regarded as scandalous and salacious; but by 1880 the age of strenuous realism with its blunt treatment of delicate matters had set in, and the book was recognized as a masterpiece.

More pronounced as a realist was Emile Zola (1840–1902), author of somber novels. "He was convinced that human beings are guinea pigs and that if he could catch a pair of thoroughly diseased human guinea pigs the observation of their progeny would reveal interesting 'laws,'" wrote one critic. Zola created two famous figures—Rougon, a maniac, and Macquart, a drunkard—to serve as guinea pigs. They became the basic characters of a cycle of romances. "Historically," wrote Zola of them, "the Rougon Macquarts have their origins in the people: they infiltrate through the whole of contemporary society, they rise to every sort of situation, and thus with the help of their individual dramas they relate the history of the Second Empire" (the period from 1852 to 1870 in the history of France). The *Dram-Shop* may be regarded as typical of this writer's art. But Zola's faith in the methods of science failed to make his novels convincing.

Anatole France (1844–1924), the greatest French author of recent years, cordially hated the grotesqueness of Zola's procedure. Although a realist, he possessed the manner and skill of Voltaire. He was as clever as that great master and as skeptical, and his philosophy is pessimistic

and disillusioning, formed as it was in a materialistic century. He appeared to have no faith in anything whether good or evil. His historical tales undoubtedly are the best. Among these are *Thaïs*, dealing with the Alexandria of the first century A.D., *The Rotisserie of Queen Pédauque*, describing the social life of France in the eighteenth century, and *The Gods Are Athirst*, the setting of which is the French Revolution. He also wrote a skeptical biography of Joan of Arc and attacked politics and religion in *Penguin Island* and *The Revolt of the Angels*.

The Realistic Novel in Other Countries. The vogue for realistic novels reflecting current conditions spread to nearly every country in Europe and to America. Thus, in Germany, Hermann Sudermann (1857–1928) wrote the novel *Dame Sorrow* and Gerhart Hauptmann (*b.* 1862) a play called *The Weavers*. In the Netherlands, Louis Couperus (1863–1923) produced *Small Souls*, a series of depressing pictures of middle-class society. In Italy, Luigi Pirandello (1867–1936) wrote bitterly realistic plays that pictured the world as governed by a harsh fate. Anton Chekhov (1860–1904), a Russian, wrote psychological plays in the realist fashion, the best known being *The Seagull* and *The Cherry Orchard*. His countryman Maxim Gorky (1868–1936) produced short stories describing social outcasts. His realism developed revolutionary tendencies; in 1917, he became a Communist.

The works of Leo Tolstoy (1828–1910) occupy a special place in the literature of the close of the nineteenth century. Tolstoy belonged to an aristocratic family and spent his early years as a soldier and officer. The owner of many estates, he inherited numerous serfs but freed them before Czar Alexander II in 1861 abolished serfdom throughout Russia. Tolstoy endeavored to raise the moral level of the lower classes by education, a revolutionary idea for a Russian aristocrat. Soon he began writing novels. *War and Peace*, with its Napoleonic setting, is a stirring plea for pacifism. Gradually, Tolstoy became more revolutionary, religious, and mystical. *Anna Karenina* is a sermon extolling sacrifice and service. His *Resurrection* combines mysticism with a realistic treatment of life's problems. Tolstoy came to believe that modern civilization was a failure; formalism had crushed its spirit. This was true of government, religion, education, art, and law. He believed that simplification was necessary and a return to the principles of the Christian religion imperative if the world were to be saved. Opposing the shedding of blood, he disbelieved in killing animals for food. A Christian might not resist evil and should renounce all property. Tolstoy's influence was enormous before the First World War.

A contemporary of Tolstoy, the Norwegian dramatist Henrik Ibsen (1828–1906) was a severe critic of modern institutions. *Peer Gynt* and

Brand satirize Norwegian politics, religion, and life in general. Ibsen hated democracy, declaring that "the most dangerous foe to truth and freedom in our midst is the compact majority." His basic idea was that individuals should assert themselves against church, state, society, and family. *An Enemy of the People* denounces the commercial dishonesty that impregnates the political actions of a democratic community. *Pillars of Society* portrays the hypocrisy of a "reputable" citizen who engages in shady business ventures, mistreating workers and dependents. *A Doll's House* presents the "emancipated" modern woman for the first time on the stage, thus creating a new literary type. Nora, the wife goes so far as to leave husband and children when her supposedly model husband treats her as a petted dependent.

SYMBOLISM IN LITERATURE. Literary vogues change rapidly, especially in modern times. After reading extensively the realist literature from Flaubert to Ibsen one may properly ask whether a rigid realism concerned mainly with the material conditions of life and criticizing its institutions really touches the foundations of life itself. Whatever answer one gives to this question, the fact is that writers began to tire of the realist vogue as early as 1880. This reaction coincided with the general feeling of surfeit from materialistic and mechanistic science. A number of writers, driven primarily by their aesthetic sense, rebelled. They became "Symbolists," writers who sought mystical effects in verse of haunting beauty. They avoided sharp word colors and disapproved of exact literal statements, preferring to use words suggestively. They were influenced by Edgar Allan Poe's word, sound, and color effects. The Symbolists were aesthetes who rebelled against the harshness of a materialistic age. Stéphane Mallarmé (1842–1898), a French poet and professor of English literature in Paris, was the first serious Symbolist. He inspired young men to cultivate symbolist verse, making poetry purely a matter of art for art's sake.

Paul Verlaine (1844–1896), the greatest Symbolist, spent his early years riotously in Paris, where he became a vagabond and wastrel and made friends with other Symbolists. Quarreling with one of them, he fired a pistol and was condemned to 2 years in prison. He had strayed far from the Christian faith but, reflecting upon his follies and miseries, returned to the Catholic fold. His verse thenceforth breathed the purest mystical devotion, using every power of word color and suggestion to express a deep religious lyricism.

Symbolism also made its appearance in England, especially in the prose and verse of Algernon Swinburne (1837–1900), a poet who lived the poorly arranged life of a neurotic. His verse possesses an extraordinary fascination because of the subtle play of rhythm and word color.

In the lower lands of day
  On the hither side of night,
There is nothing that will stay,
  There are all things soft to sight;
  Lighted shade and shadowy light
In the wayside and the way,
  Hours the sun has spared to smite,
Flowers the rain has left to play.

But after all allowances have been made, Swinburne's poetry does not teach us much. He had the characteristic attitudes of nineteenth-century liberals toward the traditions of art, politics, religion, and morality. Swinburne expressed sympathy for Nietzsche's ardor for life and had a great admiration for Darwinism. His hatred of tyranny, moral control, kings, and priests rendered his writings attractive to youthful readers. Oscar Wilde (1858–1900), also an Englishman, possessed Swinburne's characteristics but was an even more exclusive devotee of art, believing that it should be one's chief guide in life.

Other Literary Expressions of Disillusion. Not all literary artists were Symbolists, however. Some of the rebels declined to be carried away by the cult of aestheticism, preferring to express themselves in clear and frank language. Among these was Samuel Butler (1835–1902), a descendant of a line of ministers who nevertheless revolted against religion. He spent many years as a sheep farmer in New Zealand, where he wrote *Erewhon*, a utopia, trenchantly criticizing the shortcomings of modern society. His *Way of All Flesh*, to some extent autobiographical, is a more remarkable work, for in it the author states his ideas of right and wrong.

Even more than Butler, George Moore (1853–1933) marks the disillusionment in respect to religion and morals that became common in some circles. Born in Ireland, Moore spent most of his life in France, where he took over the philosophic and pagan ideas of Anatole France and presented them to the English world in *Sister Teresa* and *The Brook Kerith*. His *Confessions of a Young Man* and *Hail and Farewell* are revelations of himself as a completely developed pagan who shrank from self-inflicted hardships, loved pleasure, and believed in the expression of self as the most satisfactory form of art.

Disillusionment also received expression in a type of poetry called "imagism." A number of poets like Ezra Pound (*b.* 1885) and Richard Aldington (*b.* 1892) appear to have lost all faith in traditional moral ideas or in the value of philosophy. They believe that a poet should translate an impression into the fewest possible words, unaccompanied by moralizing, philosophizing, or interpretation. Aldington's *Hampstead Heath* illustrates the Imagist's art.

Dark clouds, torn into gaps of livid sky,
Pierced through
By a swift searchlight, a long white dagger.

The black murmuring crowd
Flows, eddies, stops, flows on
Between the lights
And the banks of noisy booths.

Finally must be noted a type of novel writing popular since the First World War. Disillusionment had become increasingly apparent by 1900, and Imagists, poets as well as novelists like the Frenchman Marcel Proust (1871–1922), expressed the feeling that a change was imminent. The war and the resultant destruction of hopes and ideals precipitated the change. Objecting to the idealism of their fathers and grandfathers, the younger generation further resented their authority. There was a growing belief that life should be lived without concern for right and wrong; life was to be unmoral, as Nietzsche had declared it should be. The old type of novel became less popular, except in the case of H. G. Wells, whose revolutionary point of view gave him an appeal for the new age. Psychological theory became the basis of the new expression. The sociological element dropped into the background while authors psychoanalyzed their characters in minutest detail. Proust's first novel, which appeared in 1913, was analytical in style and characterized by morbidity and eroticism. The author's insight is based upon Freudian psychology, his characters being ever in the course of fleeting adjustments. Proust's example was followed by writers such as James Joyce (1882–1941), author of *Ulysses;* D. H. Lawrence (1885–1930), noted for his *Sons and Lovers* and *Women in Love;* and Aldous Huxley (*b.* 1894), whose *Point Counter Point* expresses the sense of futility that sprang from postwar disillusionment.

Painting: Impressionism. The phenomena noted in literature since 1880 also appeared in painting and sculpture. The first to engage our attention is "impressionism," which, like symbolism, sought varied and natural color effects. To understand impressionism, we must keep in mind the fact that painting had arrived at marvelous perfection during the five hundred years and more that had elapsed since Giotto painted his famous scenes of the life of St. Francis of Assisi. The reproducing of open-air, light, and color effects, however, had never been seriously attempted except by Velásquez and Vermeer. An interest in nature and science roused a desire among painters to capture on their canvases something of the witchery of the play of light on landscapes. Also, there was much new knowledge about the composition of colors which they believed might be made to yield new techniques. Detesting the

rigid rules laid down by art schools, they resolved to escape from them. Edouard Manet (1832–1883) and Claude Monet (1840–1926), two French artists, were the founders and leaders of the Impressionist school. In Manet's canvases, there are color effects never previously achieved. Monet sought to capture the elusive effects of light and color in landscapes. The idea is "realistic," but the result is an "impression" for a fleeting moment. Hence the term "impressionism." Some Impressionists

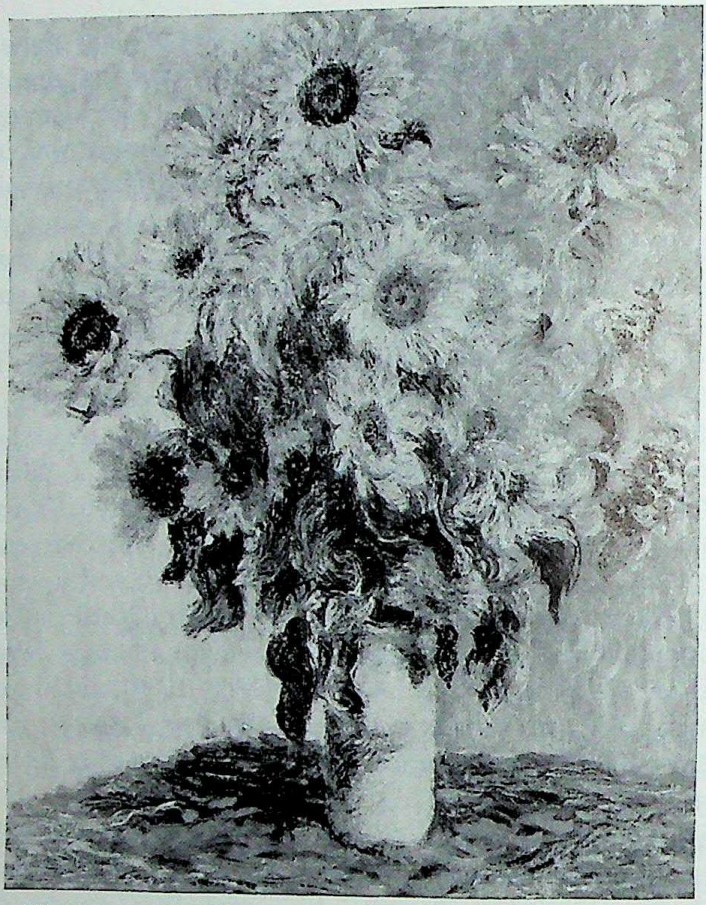


FIG. 128.—"Sunflowers," by Manet. (*Courtesy of the Metropolitan Museum of Art.*)

placed upon their canvases dabs or points of unmixed colors, leaving the eye to mix the effects and obtain the dancing rhythm observable in sunlit scenes. The result is a marvelously true impression of the colors of nature such as no earlier artists had been able to produce.

Special mention must here be made of a highly original artist whose work was widely influential and justly admired—the American James McNeill Whistler (1834–1903), who lived most of his life in England. Studying under Manet, he was introduced to the problems of painting from the standpoint of impressionism. Whistler, although he never

outgrew his early impressionist teaching, was always something of an individualist. He was fond of Japanese prints; in fact, he was one of the first in the Western world to appreciate them adequately. Through his efforts to approximate their artistic qualities, Japanese prints acquired wide popularity in Europe and America. Whistler is noted as the painter of "The Artist's Mother," other portraits, and many landscape impressions, and as the author of the remarkable *Gentle Art of Making Enemies.*

POSTIMPRESSIONISM. In spite of its good qualities the Impressionist school possessed some serious shortcomings. Scenes were limited almost

FIG. 129.—"Apples and Oranges," by Cézanne.

entirely to brilliant glimpses of nature and lacked the profound meaning that artists of the Barbizon school had given to their canvases. Hence arose the Postimpressionist school, founded by Paul Cézanne (1839–1906), who wished to combine solidity of form with the luminous landscape effects of Manet and his followers. He applied thick layers of pigment to his canvasses in order to give the impression of corporeal solidity and used distortion to help increase this effect.

In general, Impressionists and Postimpressionists received little approval in their own day; but two exponents of postimpressionism have gained so much recognition in recent years that they must be mentioned.

Both Paul Gauguin (1838–1903), a Frenchman, and Vincent van Gogh (1853–1890), a Netherlander, were positively detested by their contemporaries. Gauguin adopted the technical methods of the Impressionists but interpreted objects in a subjective manner. He wished to express personality and refused to be limited by materials or subjects. Van Gogh, whose obsession was to paint the intensity of the forces of

FIG. 130.—"Self-portrait," by van Gogh. (*Courtesy of the Detroit Institute of Arts.*)

nature, applied his pigments so that they seemed to dance in a medley of bright colors. Both men died insane; whether their condition influenced their art is difficult to state.

OTHER MODERN DEVELOPMENTS IN PAINTING. Since 1900, painting has continued to develop under the influence of impressionism and post-impressionism. Gauguin and van Gogh were keenly admired and inspired many painters. Some artists disapproved of the corporeal insubstantiality of the Impressionists and, following Paul Cézanne,

developed "cubism." They sought to give a sense of solidity by conceiving objects as being constructed of geometrical solids. Pablo Picasso (*b.* 1881), a Spaniard, led in this movement. Cubism was dethroned during the First World War by another school, the "Futurists." Just as the Impressionists had broken up color into its component parts, so the Futurists attempted to break up the objects they were painting. They endeavored to get away from the static effects of the Impressionists; hence, the name "Futurists"—they wished to give some idea of time and concrete movement. A famous example is Marcel Duchamp's "Nude Descending a Staircase," the rhythmic presentation of a nude actually proceeding down a flight of stairs and occupying several successive positions.

"Expressionism" came to the fore after the First World War; the painters of this group used the extravagant color schemes of some of the impressionists but treated the elements of their pictures with great freedom. Proportions were altered and parts were shifted the better to "express" the artist's meaning. "Surrealism," of which Salvador Dali (*b.* 1904) is the principal exponent, also has enjoyed a brief vogue. Surrealists paint combinations of all manner of impossible and illogical objects realistically and as if they are dreamed. The result, they claim, is more than real—it is super-real, or "surreal." These schools succeeded each other with amazing rapidity. Each had something to contribute or to emphasize, but in most cases the public had little understanding of what was being attempted.

Sculpture. In sculpture, the name of the Frenchman Auguste Rodin (1840–1917) comes first. Objecting to the excessive worship of classical statuary, he turned to a "realist" treatment of subjects and reflected the pessimistic materialism of his day—perhaps the "will to power" championed by Nietzsche. The outlines of his works are blurred, suggesting impressionistic influences. Psychological analysis is a prominent feature. His "Thinker" suggests man evolving from the brute creation, a possible illustration of the Java man. Rodin's works never express optimism, for the materialistic philosophy of the age left scant room for the free deployment of the human spirit.

The Belgian sculptor Constantin Meunier (1831–1905) was interested in labor and machinery and was thus a sympathetic interpreter of the Industrial Age. Through mastery of the human form, he became a most successful portrayer of workingmen. Among his notable productions are "The Smith," "The Miner," "The Mower," "The Puddler," and "The Hammerer." These works would serve as illustrations for a history of the Industrial Age.

Architecture. Architecture is the most practical of the arts because it is concerned with structures to house human beings and their activities

such as religion, sports, commerce, and industry. The rapid development of industrialization during the nineteenth century produced a demand for more and ever larger buildings requiring new methods of construction and new building materials. The phenomenal advance in science, especially in metalworking, enabled architects to put up stronger and more commodious structures. Reinforced concrete took the place

FIG. 131.—"Seated Woman," by Gauguin. (*Courtesy of the Worcester Art Museum.*)

of stone laboriously shaped by hammer and chisel. Synthetic stone began to be used. A completely new type of structure evolved, based upon structural steel. After a building was planned, steel beams, joists, and girders were manufactured, according to specifications given in blueprints, and were securely bolted and riveted together.

Such revolutionary methods, developed as an engineering science, have led to striking innovations, the most significant being a style of architecture called "functional." Architects sought to adapt the appear-

ance and practical features of structures to the uses for which they were intended. They strove to combine the maximum amount of space with an abundance of air and light. In this tendency we note the influence of modern medical ideas regarding sunlight therapy and also the teachings of sanitary engineers. The invention of blocks of glass in 1933 has

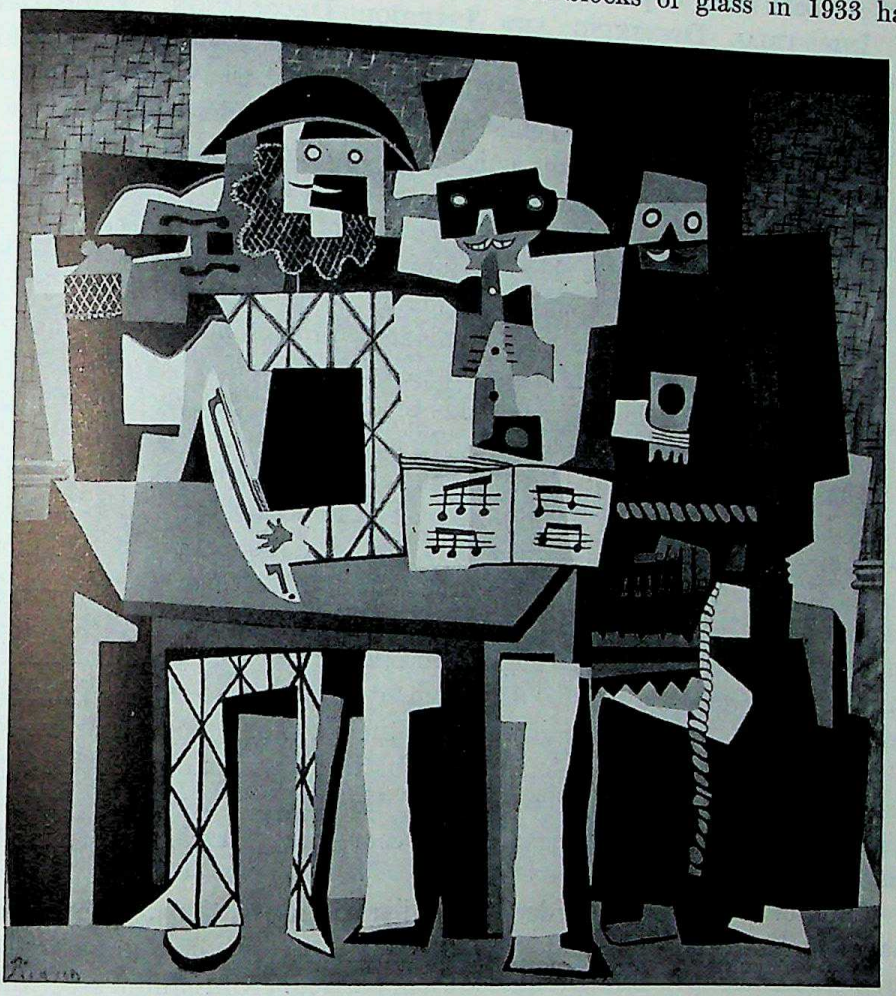


FIG. 132.—"The Three Musicians," by Picasso. (*Courtesy of the Museum of Living Art, New York.*)

stimulated the abundant use of glass in walls. Functional architecture was first stressed in the Netherlands but in recent years has been adopted by the architects of other countries, not only in Europe but also in America.

Churches, schools, houses, railroad stations, hotels, factories, and office buildings in the functional style have been erected. The Van Nelle tobacco factory in Rotterdam (page 937) admirably illustrates this tendency in industrial structures. In America the functional idea has

been applied to skyscrapers. The Manhattan Bank Building of New York (page 942) stresses vertical lines, suggesting that its architects have borrowed from Gothic architecture. Other skyscrapers emphasize massive surfaces pierced with large windows. The upper stories of such buildings are set back so as to permit an abundance of light and air.

Industrial Designing and Interior Decoration. Industrial designing is one of the interesting aspects of art in the modern mechanical age. When the Industrial Revolution began about two hundred years ago, inventors were concerned chiefly with producing efficient machinery. They paid little attention to the artistic aspects of machines and factories. Practical considerations came first, and successful manufacturers ignored the criticism of artists of the drab appearance of their factories.

Gradually, this attitude changed, for it was found that the purchasing public preferred products that looked well. Designers began to beautify machinery. Useless details were eliminated, protruding parts reduced, and ugly lines avoided. Machine design has been facilitated in late years by the production of new kinds of steel, particularly chromium, and the novel use of glass in walls, roofs, and furniture.

European workers contributed much to the development of machine designing, but Americans during the past generation have not been far behind. The illustrations on page 944, by an industrial designer, show the changing design in ship construction from 1807 to the streamlined vessels of the present and the future. A comparison of early with later models of telephones, railroad engines and cars, automobiles, and all kinds of machinery reveals a parallel development in the entire range of industrial activity. "Already we can glimpse the community of tomorrow as a place unified and harmonious: an industrially designed machine-age entity. It is the emergent product of the twentieth-century industrial pioneers: a new American scene, coordinated, artist-determined, machine-realized."

Interior decoration has undergone similar transformations. Designers have sought to avoid all ornate and superfluous decoration, aiming at the greatest simplicity. Straight lines are emphasized. Chromium steel and glass are abundantly employed in furniture and furnishings. Hygienic considerations undoubtedly play a great part in this kind of interior decoration.

Behind all these ideas in architecture and design we clearly see the practical force of scientific ideas organizing the things used in everyday life. Philosophically, they proclaim the triumph of a more or less materialistic conception of life.

Music. Music did not reflect the important trends of thought and feeling nearly so readily as did literature, painting, and sculpture. It happened that the great masters of the Romantic Age such as Gounod

and Verdi lived until the close of the century and so continued to dictate popular tastes. Further, as the opera was subsidized in many countries, political influences inevitably favored patriotic themes, which were always romantic. The age boasts many significant compositions. Such are the symphonies and other works by Johannes Brahms (1833–1897), considered by many the greatest modern German composer; the strongly nationalistic music of Edvard Grieg (1843–1907), of Norway; and that of Antonin Dvořák (1841–1904), a Bohemian. Johann Strauss (1825–1899), a Viennese, produced gay waltzes such as *The Blue*

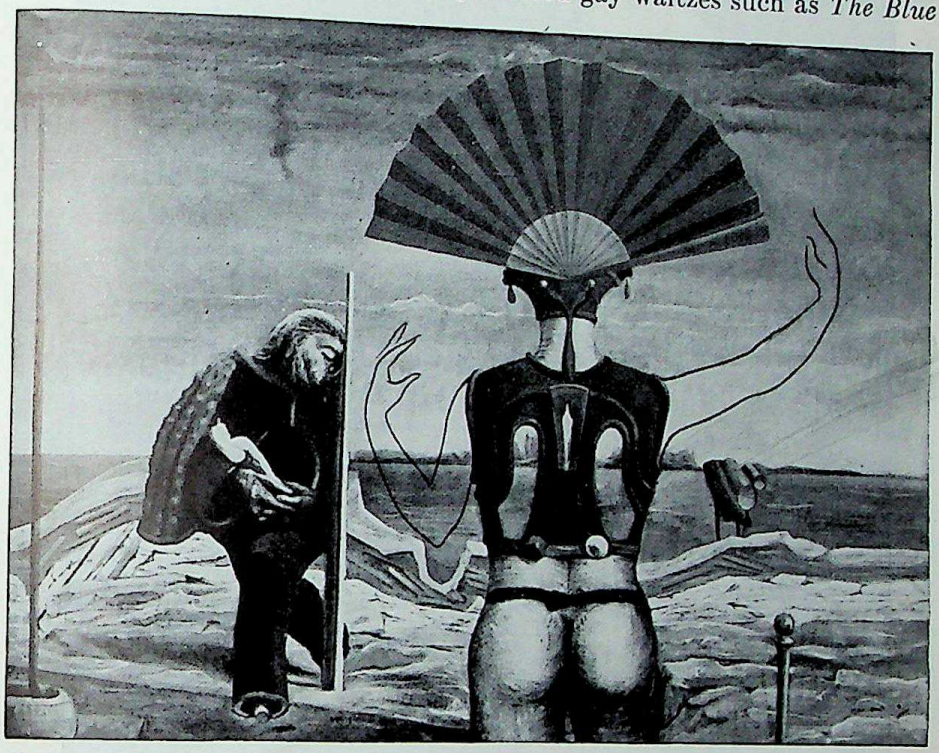


FIG. 133.—"Woman, Old Man, Flower," a surrealist painting, by Max Ernst. (*Courtesy of the Museum of Modern Art.*)

Danube. In Italy, Giacomo Puccini (1858–1924) continued the romantic tradition by producing such operas as *La Bohème*, *Tosca*, and *Madame Butterfly*. Russian music likewise was romantic, although more restrained than that of western Europe. Among the compositions of Petr Tchaikovsky (1840–1893) are six symphonies and the *1812 Overture*, celebrating the Russian victory over Napoleon. Nikolay Rimski-Korsakov (1844–1908) elaborated Russian folk music and made use of oriental themes. Modest Moussorgsky (1835–1881) wrote the patriotic opera *Boris Godunov*.

But the realistic sentiment, expressed in science, philosophy, literature, painting, and sculpture, ultimately appeared in music. The haunting suggestiveness of the Symbolists shows in Rimski-Korsakov's

work. Richard Strauss (1864–1949) fell under Nietzsche's influence and has made frequent use of some of the ideas of symbolist poets in his best known compositions—*A Hero's Life, Elektra,* and *Salomé.* But it was the Frenchman Claude Debussy (1862–1918) who broke completely with the past and became a frank modernist. About 1880, he began to

Fig. 134.—"Flight of Love," by Rodin. (*Courtesy of the Museum of Fine Arts, Boston.*)

experiment with symbolist and impressionist effects. His style appealed only to those well educated in music, for it involved a radically novel type of composition using dissonance rather than harmonious chords. Debussy sought to produce effects by suggestion, preferring vagueness and a somewhat deceptive delicacy. His music is so much a part of his personality that it is impossible to imitate it successfully.

The closing years of the nineteenth century and the early decades of the twentieth presented a confused variety of thought not only in

philosophy and religion but also in literature, art, and music. No single tendency was evident unless perhaps devotion to experimental science and expanding the material foundations of life. But basic ideas in physical and biological science were changing, which added to the uncertainty and confusion. On the other hand, the control over nature vouchsafed by science continued to increase man's power, and this also influenced artistic activities. Streamlining to reduce friction, the abundant use of glass in order to utilize the beneficial action of light, new medical knowledge, which produced better methods to combat disease and prolong life, better

FIG. 135.—Van Nelle factory, Rotterdam. (*Courtesy of the Netherlands Railways.*)

plumbing and larger buildings to facilitate expanding businesses—all show the powerful influence of modern scientific ideas. But significant as all these triumphs appeared, all was not well with life and thought at the opening of the First World War in 1914. This disaster and the catastrophes which have subsequently overtaken the world, particularly in 1940, clearly revealed fundamental weaknesses in modern life and thought.

FOR FURTHER READING

ALBJERG, V. L., and M. H. ALBJERG: *From Sedan to Stresa*
BERTAU, F.: *A Panorama of German Literature from* 1871 *to* 1931
BINKLEY, R. C.: *Realism and Nationalism,* 1852–1871
CHENEY, SHELDON: *World History of Art*

——— and MARTHA CHENEY: *Art and the Machine: An Account of Industrial Design in 20th Century America*
GARDNER, H.: *Art through the Ages*
GOULD, G.: *The English Novel*
GREEN, F. C.: *French Novelists from the Revolution to Proust*
LONG, W. J.: *American Literature*
MARBLE, A. R.: *A Study of the Modern Novel. British and American*
SCHEIFLEY, W. H.: *Essays on French Literature*
WILENSKI, R. H.: *French Painting*

Chapter LIII

SOME PROBLEMS OF THE PRESENT

For we know in part, and we prophesy in part.—Corinthians 13:9

THE YEARS from 1914 until the present have brought an extraordinary crisis into the life of every people. The First World War (1914–1918) sprang from rivalries due to nationalism, imperialism, and militarism, all of which were characteristic of nineteenth-century life and thought. The loss of life occasioned by this conflict, the blasting of the hopes of vast numbers of human beings, the bankruptcy of nations, and the resulting social and economic insecurity tested as if with fire the stability of the ideals of the foregoing century.

During the years following the First World War, from 1918 to 1939, the confusion observable for several decades previous in science, art, and literature and especially in philosophy and religion, described in the foregoing chapters, was accentuated by the political, social, and economic chaos into which the world had been thrust by the war. This was a time of novel and revolutionary experiments such as Russian communism, Italian fascism, and German National Socialism. The states adopting these political philosophies challenged the European order existing before 1914 and threatened to introduce a radically new kind of society.

Finally, in 1939, came the disastrous Second World War, lasting until 1945, which left the nations of Europe and Asia exhausted. Besides altering the relative political position of most powers, the war brought forth the United States as the wealthiest nation and the greatest military power on earth. Confronting this power securely established in the Western hemisphere appeared the U.S.S.R. Entrenched in eastern Europe and in northern Asia, that state, surrounded by satellite powers, presented a threatening array of military power endangering the peace and liberties of peoples.

The League of Nations. What seemed a promisingly constructive act amid the confusion attending the close of the First World War was the formation of the League of Nations at the suggestion, in 1918, of Woodrow Wilson, president of the United States. This league would, it was hopefully believed, put an end to war. The people of Europe, including the conquered, approved the idealistic plan which promised in the preamble of the Covenant, as the document creating the League of Nations was called,

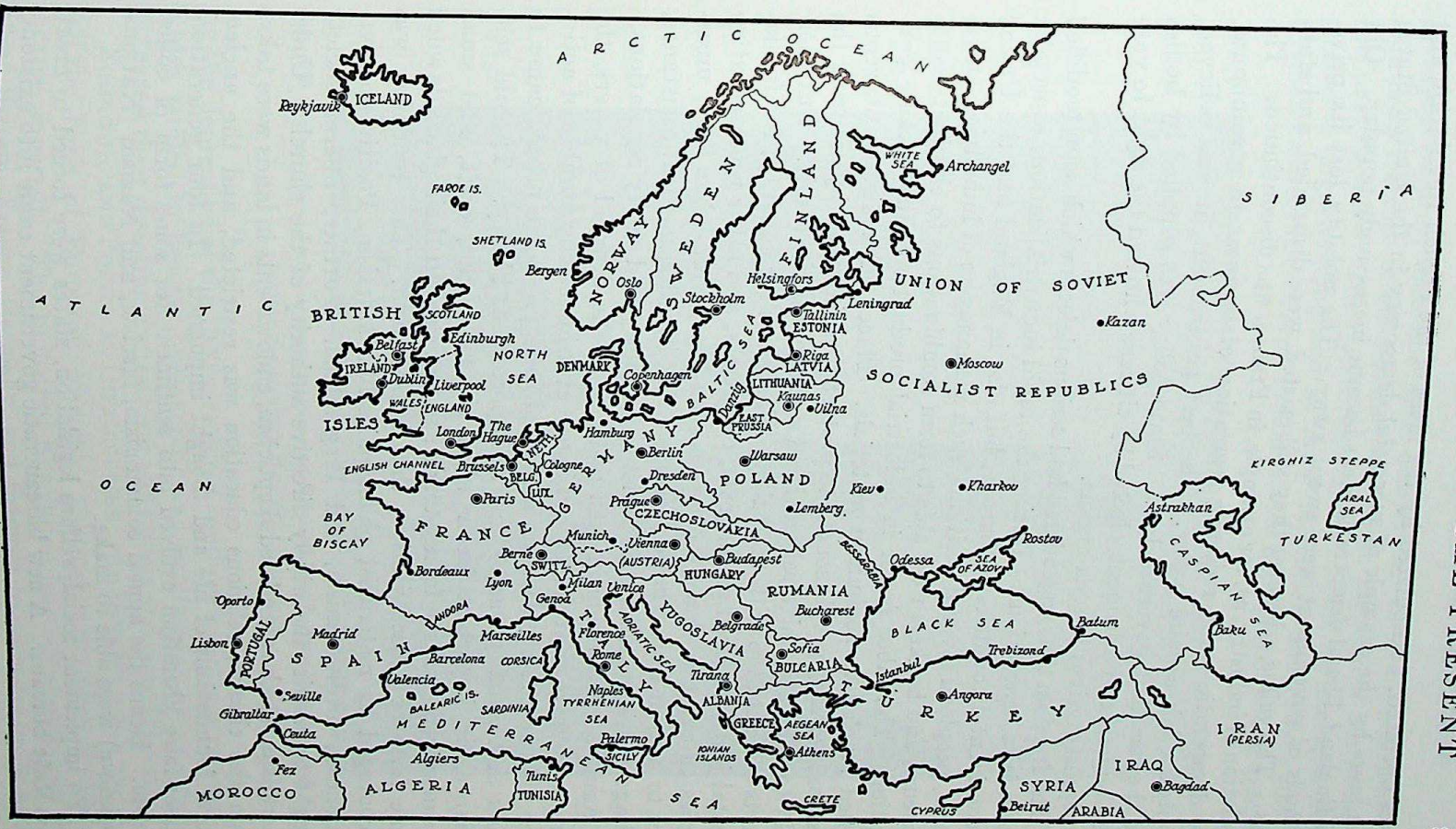
to promote international cooperation and to achieve international peace and security by the acceptance of obligations not to resort to war, by the prescription of open, just, and honorable relations between nations, by the firm establishment of the understandings of international law as the actual rule of conduct among governments, and by the maintenance of justice and a scrupulous respect for all treaty obligations in the dealings of organized peoples with one another.

The League included the signatories of the Treaty of Versailles (1919), which marked the end of the First World War, and thirteen neutral states were also invited to sign. At a later date other powers, including Germany and its allies, were to be invited to join. The League was to operate through several organs: Assembly, Council, Secretariat, certain commissions, and a Permanent Court of International Justice. The League was to form a special organ, not infringing upon the rights of any state, to promote good will among all nations, encourage them to cooperate for the common good, and promote the advancement of peace.

The League's Assembly was composed of a delegation of two or three representatives from each of its members. The Assembly could investigate disputes, admit new members, and make rules governing procedure. The Council, exercising the chief functions of the League, was formed of the League's permanent members and other states as the Assembly might designate. To provide a central organization, the Secretariat was created, guided by a secretary-general named by the Council and approved by the Assembly. The Secretariat was to carry on various investigations through special commissions of experts and also publish treaties. A Permanent Court of International Justice was instituted to adjudicate disputes between nations and give advice on questions submitted to it by the Assembly and Council.

The League possessed defects which led to its failure. First, it was composed of the nations that had defeated Germany and the powers associated with Germany. The Treaty of Versailles became the basis of action; and the League was regarded by the defeated nations as an instrument to enforce that drastic document. The League merely perpetuated the military victory, they asserted. Second, the Assembly was the scene of much national diplomatic maneuvering. Serious dissensions might at any moment disrupt the League. Further, its stability was impaired when the United States refused to ratify the Covenant and take an active part in its proceedings. So the nation that exercised the greatest moral influence during 1918 and 1919 withheld its support at a moment when universal acceptance of the Covenant was needed to make the League a successful institution.

The Liberal or Democratic State. Before pointing out some of the difficulties modern liberal and democratic states encountered after 1918, it is well to state some of the basic conceptions upon which such



MAP XXXVII.—Europe in 1938.

states operated. Stimulated by the ideas of the French Revolution and even more by the example of successful democracy in the United States and England, liberal democratic ideas became increasingly popular. Old methods of government were swept away. The nobility lost its privileges. The guilds, wherever they still existed, were disbanded, and state regulation of industry, as, for example, in France, was discontinued. The new democratic state, reducing regulation of business to a minimum, adopted a laissez-faire policy. The best government, it was believed, was the one that governed least. State policy was supplied by bodies like Congress or Parliament, elected by citizens who had the right to vote for representatives in such organs.

The freedom thus engendered had serious defects which soon modified laissez-faire conceptions. During the rapid industrialization, especially in continental countries of Europe, but also in England and the United States, people in favored positions, such as managers of industries, entrepreneurs, and bankers were able to form combinations to eliminate competition. The labor factor in industrial production thus became controlled much like nonhuman materials. Placed in a disadvantageous position, working people sought to protect their interests by securing the right to vote, and universal manhood suffrage was the result. But their efforts did not stop with the ballot. Eagerness for equality, for fundamental justice, caused parliaments, congresses, and other representative bodies to enact workmen's compensation laws, child-labor laws, measures to restrict employment of women, sick benefits, medical assistance, old-age pensions, and a wide variety of sanitary and safety regulations.

Assuming leadership in such matters, at the demand of voters, the state grew more powerful, embracing an ever-increasing number of activities vital to the people in an industrial society. Some people came to think that equality was at least as important as liberty. The old self-reliance, an important factor when village, manor, craft, and small business were positive forces, tended to vanish. In their place dawned some form of collectivization, that is, socialism. This tendency was encouraged by materialist philosophies like Marxism, Positivism, evolutionism, Utilitarianism, and Pragmatism. Further, liberal society sought to restrict the widely directive authority of the church. Under liberalism, which engendered skepticism, endowments in lands were taken from the church, religious education was restricted, and the ancient moral foundations of life and thought impugned. In four generations laissez-faire liberalism evolved into sentiment for some form of collectivism. Hence the appeal communism, fascism, and Nazism (National Socialism) were able to make.

To implement social-welfare legislation, states were forced to create new state bureaus. A new bureaucratic government came into existence

in every country, even the most democratic, as is witnessed by the enormous increase of officials and bureaus in the United States during the past decades. The Social Security Act alone, for example, necessitated a large building and an army of officials and clerks; and the Civilian Conservation Corps, to take care of unemployed young men dur-

FIG. 136.—Contrasts in architecture: skyscraper Bank of Manhattan Building and Greek-temple Subtreasury Building, New York.

ing the depression of the 1930's, required another elaborate organization. States tended to become bureaucratic and paternalistic; they steadily increased their directing control over individuals and organizations.

ECONOMIC AND POLITICAL DIFFICULTIES. An economic crisis impugning the basis of European economic, political, and other leadership became apparent. The Industrial Revolution had raised countries like Great Britain, France, Germany, and Belgium to ascendancy in world

economic life. Such leadership appeared to be coming to an end after the opening of the twentieth century, for countries overseas hitherto dependent upon these industrial states for manufactured goods began developing competing industries. Foremost in creating an industrial system was the United States, a most efficient producer of goods on the basis of quantity production. Brazil, Argentina, and Chile likewise began to supply their own industrial needs. Japan forged ahead in industrial development. During the First World War, European states bought materials wherever obtainable, thereby stimulating industrialists in "backward" countries. When peace came in 1918, European manufacturers found new competitors. It proved difficult to recapture lost markets. Cotton factories in England and the Netherlands lay idle because Japanese manufacturers undersold English and Dutch merchants.

Competition for business under such circumstances assumed great significance. England hoped to keep a preferential trade with her colonies; "Buy British Goods" became a favorite slogan. Such campaigns, however, had little success, for the colonies also were developing their own industries and even wanted to protect them by tariffs. Another expedient was to erect tariff barriers. Some nations tried to produce all goods needed by their subjects, endeavoring to restrict imports from foreign lands because their own industries had depreciated critically after the First World War. The more self-sufficient the nations of Europe sought to become, the greater the decline in world trade.

The world-wide depression beginning in 1929 aggravated the malady caused, in part at least, by this economic maladjustment. The world's stock of gold was held by a few countries, chiefly the United States, Great Britain, France, Switzerland, and the Netherlands. Gold could not flow freely because the currency of the countries having no gold sold at a discount. International trade declined drastically. Nations defaulted on their bonds, unable to pay interest as well as principal. Holders of securities were impoverished; all classes felt the pinch of scarcity. The depression put a strain upon private charity, and states inaugurated schemes of relief. In many European countries such efforts to alleviate hardships among the unemployed had been in operation since the end of the First World War. Even in the United States, where there still was much opportunity and material plenty, extensive agencies were created for public relief. The Works Progress Administration (WPA), National Youth Administration (NYA), and Civilian Conservation Corps (CCC) were formed during the 1930's. Such remedial agencies, being expensive, forced higher taxes upon the country. The national debt of America, as well as of other states, soared rapidly.

Labor Problems. One of the greatest problems in modern industrial society is the condition of the workingman. Justice demands that he receive a fair proportion of earnings, that he may live in some comfort and security, maintain a home, and provide for the education and moral training of his children. If the blessings of stable home life are denied him, the workingman, believing that the present industrial system thwarts his best hopes, may some day seek to overthrow the system which seems to make social justice impossible. Such an upheaval may destroy much of lasting worth, cause untold misery, and rivet the shackles of a devastating tyranny. Bitter hatreds so engendered threaten to destroy the ancient sanities by which men for ages have sought to guide their lives, among which are the precepts of religion, the practice of self-reliance, the cultivation of the arts, the contemplation of truth, and cooperation in the establishment of justice and charity in national and international life. Destruction of such forces would make man poor indeed.

Division of labor, minute specialization, and the mechanization of industry—the factors which it was believed in the heyday of the Industrial Revolution would make possible an abundance of material goods—have aggravated the social problem. Few laborers are so situated as to grasp the far-reaching ramifications of the industry in which they are but parts in a gigantic machinelike structure of production. They cannot master the forces that control their labor; they fear with much reason that their position and income are insecure. Laborers of every industrial group dread unemployment. So they organize to prevent it so far as possible. The strike has become the accepted means of enforcing their demands. But this is an instrument which frequently fails to better the workman's condition. In recent years the strike has even become a dangerous weapon, for behind the acts of strikers may lurk the forces of revolution. Being well organized, pressure groups tend to force the state more and more to extend its control over industry, trade, and agriculture. In short, because of these and other difficulties, the state has become paternalistic, socialist, and, in some instances, totalitarian.

The Soviet Revolution. Meanwhile Russian communism forced itself upon the attention of the world. During the First World War great difficulties overwhelmed the Russian people. The long war, fought since August, 1914, dislocation of many people, inflation, and war-weariness prepared them for political changes. Such was the discontent that the Czar was constrained to abdicate in March, 1917, and a provisional government composed of moderate elements was set up. But the defeats suffered by the Russian army during the following summer strengthened radical socialist propaganda, which drew its inspiration

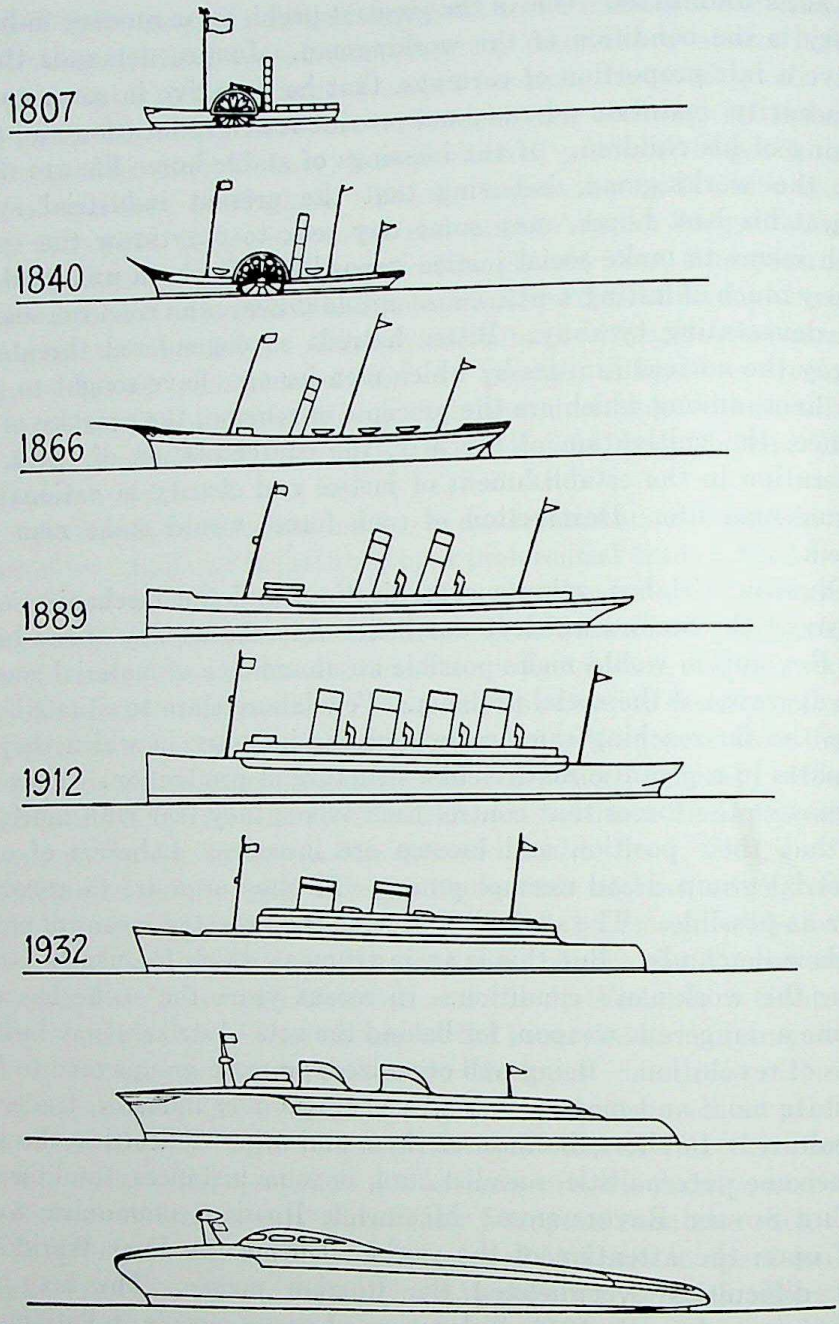


FIG. 137.—Streamlining: development chart of power ships. (*Courtesy of Raymond Loewy.*)

from the teaching of Karl Marx. Large numbers of discontented folk—land-hungry peasants, industrial workmen who could scarcely make a living, and war-weary soldiers—enlisted under the revolutionary banner of the Bolsheviks, believing that their promises would bring peace, land, and plenty.

The revolution broke when the All-Russian Congress of Soviets met in Petrograd on Nov. 7, 1917, and was controlled by the radical Bolsheviks. They shouted, "Long live the revolution of the workers, soldiers, and peasants," and caused the arrest of all but one of the members of the provisional government. The Congress assumed control of the government and on Nov. 8 appointed another provisional government called the Soviet of the People's Commissars.

Leaders of this revolution were Nikolay Lenin (1870–1924), student of Karl Marx's writings and himself author of many works on the theory of socialist revolution, and Leon Trotsky (1877–1940), an even more energetic propagandist. Lenin accepted a completely materialistic conception of culture. He taught that all culture sprang out of economic organization. Greed and selfishness had led to the monopolizing of land by the nobility, of business by the *bourgeoisie*. Peasants and workers had been drugged into obedience by "bourgeois ideals." These "true creators of wealth" had been robbed of their just earnings. To restore their rightful share was the function of the new communist state.

Character of the Soviet State. The new communist state of Russia recognized as citizens only workers, rural and urban. Former czarist officers, people who lived on unearned incomes or from the labor of others working for them, priests, and members of the nobility were excluded. The conception of natural rights—rights which no state may infringe—was set aside as "bourgeois." These groups, at first excluded from the privilege of voting, were later given that right by the new constitution of 1936. By that time, however, a large proportion of these people had been "liquidated," that is, shot or placed in prison or in concentration or labor camps.

Theoretically, the highest authority in the Union of Soviet Socialist Republics (U.S.S.R.) resides in the All-Union Congress of Soviets, its membership elected by regional congresses and town and factory soviets. The Union is directed by the Central Executive Committee, composed of members elected by the All-Union Congress. This Committee meets three or four times a year to consider constitutional problems, legislation, and matters of local government. When not in session its functions are discharged by the Presidium, a group of from ten to twenty men chosen by the Central Executive Committee. The Council of Peoples' Commissars, at present called Ministers, is a sort of cabinet and also is appointed by the Central Executive Committee. There are Ministers (formerly Commissars) of foreign affairs, foreign trade, labor, communication, army, and other public business. Essential governing organs of the U.S.S.R. at present are the Presidium and the Council of Ministers.

The U.S.S.R. is a federal union composed (since 1944) of sixteen

soviet socialist republics. Each possesses its electoral and political system, which practically is a duplicate of the system governing the U.S.S.R. This government, in the republics as well as in the union, is very different from that obtaining in democratic states. In the latter, the direction of government is in the hands of the representatives of the people directly elected by them in free elections and from competing candidates. In the Soviet Union, however, the government is managed by groups chosen by representatives sitting in the Supreme Soviet and elected by the regional congresses of soviets and the local town and factory soviets. There are no competing candidates. The Presidium, Council of Ministers, and the Central Committee of the the Communist party run the state bureaucratically.

Government by the Communist Party. To comprehend the method whereby the Communist party from the beginning has controlled the U.S.S.R., it is necessary to grasp the Communist theory of party government. It is basic Communist teaching that in the classless state, only peasants and workingmen and intellectuals supporting Communist tenets will exercise control. Membership in the Communist party was restricted, being limited to no more than about 5 per cent of the total population. Carefully selected in the beginning, a considerable number were purged annually. A compact group, convinced of the truth of the official Marxist philosophy of the state, these people think and act practically alike on all political matters.

The Communist party, to control governmental organs, holds congresses composed of delegates from Communist groups in the rural and urban soviets. The party congress names the Central Committee, which, being too large to transact the business of the party, delegates its authority to the political bureau (the Politbureau), composed of nine members and eight alternates. This bureau, the most powerful unit in the party, determines all questions of policy. Its head, the secretary of the Central Committee, is the most powerful figure in Soviet politics. The party congress approves the measures of the Politbureau and the Central Committee, while the latter directs the rural and urban soviets. For every office in the government the Communist party presents picked candidates, who as a rule are not opposed and are always elected. When elected, these officials control the important posts in the state and bend all political action to their will. Thus the Communist party is an invisible political apparatus acting behind the scenes and controlling the huge soviet bureaucratic state.

Policies of the Soviet State. True to its socialist inspiration, the government of the U.S.S.R. carried forward a policy of collectivization of land, forests, minerals, banking, trade and commerce, and insurance. The Communist state took over the functions of owners and

entrepreneurs. The carrying out of a project of such stupendous proportions resulted in confusion; industrial production was reduced to a mere fraction. Besides, the peasants who had joined the Communist revolution thinking that they would now become owners of the land they tilled rebelled against the soviet state when by decree, in May, 1918, it ordered them to turn over to the state the bulk of their grain. The peasants resisted the state's collection of grain by force and reduced production. Food became scarce, and a great famine ensued. In 1921, to encourage farm production, the government inaugurated the New Economic Policy (NEP). While retaining ownership and control of all

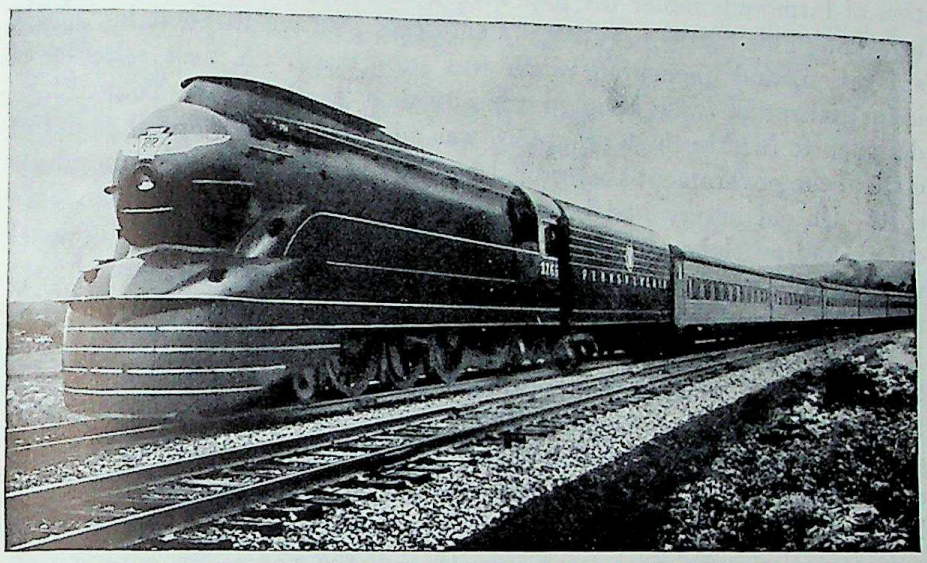


FIG. 138.—A streamlined train. (*Courtesy of the Pennsylvania Railroad.*)

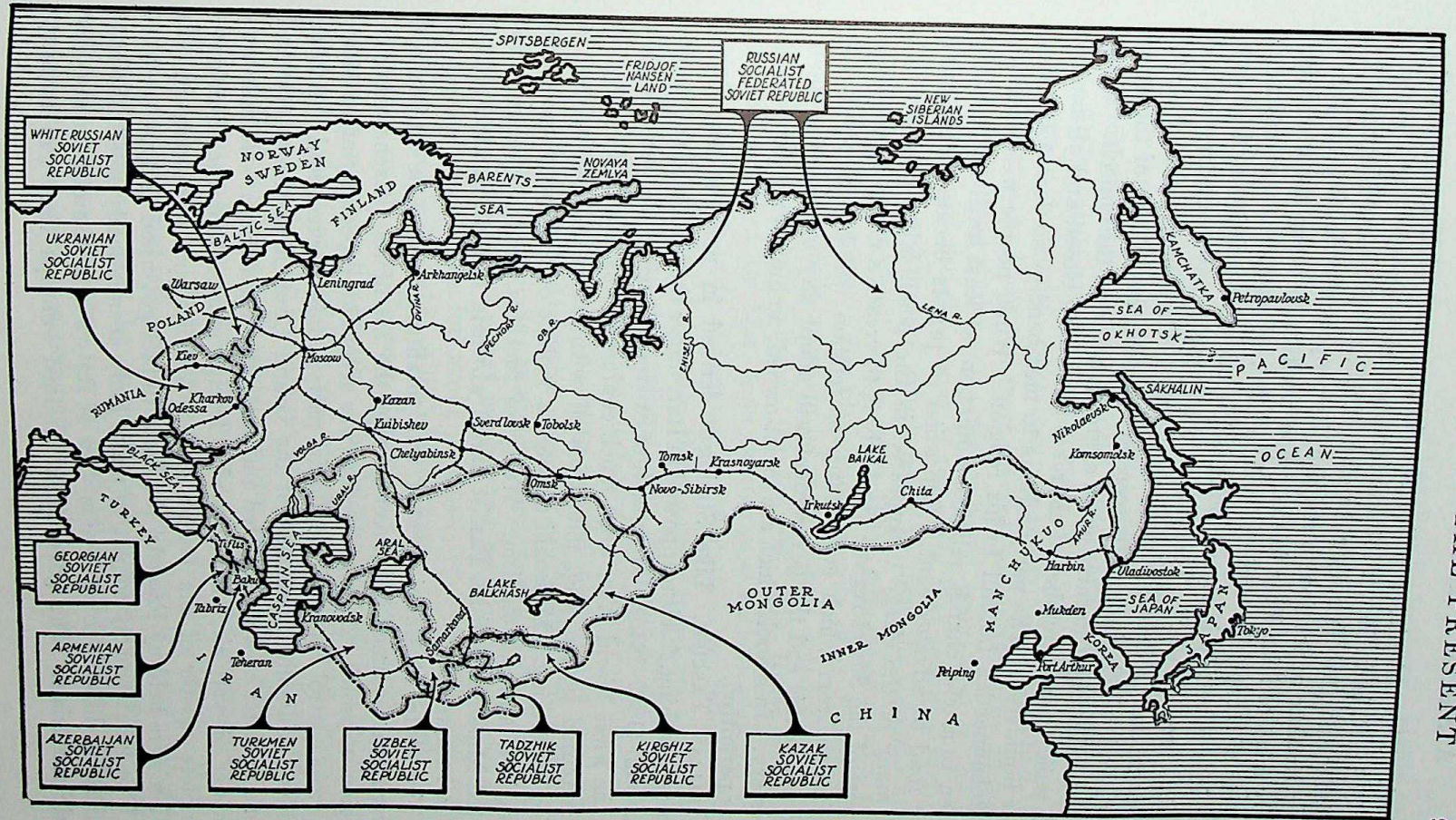
agencies of production, they made concessions in various branches of economic life, especially farming. The peasant was permitted to dispose, for his own profit, of a part of the grain he raised. Under NEP the government consolidated its Communist control but managed to encourage the peasantry to increase the production of food. The tillers, benefiting from this policy, soon became better off, but this policy was denounced by Trotsky, who wanted the Communist revolution to be applied consistently and ruthlessly.

Meanwhile, with the death of Lenin in 1924, Joseph Dzhugashvili, a Georgian, born in 1879, rose to power. A revolutionary, he had spent much time in prison, but granted amnesty in 1917 at the time of the Revolution, returned to Russia, was active in organizing soviets, and became secretary of the Communist party, a post of central importance. A practical man, though a revolutionary, he was not a doctrinaire visionary. He broke with the extremist Trotsky, who wanted a com-

pletely leveling revolution in Russia and elsewhere as a step preliminary to creating a completely socialist state. Trotsky and his "trotskyite" followers in 1927 were deprived of power, Trotsky himself fled the country, and Stalin ("man of steel"), as Dzhugashvili was popularly known, proceeded to revamp Russian society and economy according to his idea of what the communist state should be.

This new conception, called Stalinism, though drastically revolutionary, was brutally realistic, practical, and dictated by the national interest. Under NEP the peasants had recovered some prosperity. These *kulaks* now were required to submit to a far-reaching collectivization of farmlands under the first Five-Year Plan, inaugurated by Stalin in 1928. This measure, ruthlessly enforced, resulted in great hardship, starvation, and opposition which was suppressed. A vast scheme of industrialization was adopted. In 1933 a second Five-Year Plan, designed to further these programs, was adopted. But the full socialist control the government had gained by 1937 was secured at tremendous cost. Untold misery had been inflicted, large numbers had been executed, and an elaborate system of penal labor camps had been created wherein millions of men and women labored under guard with no adequate medical care and deprived of their most elementary rights.

The Constitution of 1936, Revised Feb. 25, 1947. The constitution adopted in 1918 had provided the basis of state organization through these stirring events. But in 1936 considerable changes were effected in conformity with the principles of Stalinism. Under the 1918 constitution industrial and peasant workers over eighteen years of age had the right to vote. Industrial areas enjoyed a 5 to 1 proportion of representation over rural areas even though the peasantry constituted 87 per cent of the population and the industrial workers constituted less than 10 per cent. Under certain conditions, industrial workers might vote more than once. Further, officers of higher governing bodies were elected indirectly, since the constitution of 1918 provided for a system of pyramidal delegation of representatives. The 1936 changes put an end to this cumbersome system. Voting was made direct and secret, and no longer by a show of hands. Discrimination against peasants and intellectuals in favor of the "proletariat" was discontinued. Deputies in the Council of Union and the Council of Nationalities, which constituted the Supreme Council of the U.S.S.R., were chosen by universal suffrage. The new constitution also permitted peasants and craftsmen to produce by their own labor a limited quantity of food and goods to sell for their own advantage. Though the new constitution of 1936 and the revision of 1947 are asserted to be "democratic," only the Communist party is allowed to function. At every level, lists of candidates for election are presented only by party members, and opposition candidates are not per-



MAP XXXVIII.—Union of Soviet Socialist Republics.

mitted. The ubiquitous police exercises an ever-vigilant supervision. The U.S.S.R. is, in fact, a totalitarian and police state.

Religion and Thought in the U.S.S.R. Russian Marxism has shown resolute opposition to religion, its proponents viewing religion as simply a set of false ideas foisted upon workers to make them obedient subjects of a capitalist society. Since 1936, when the new constitution went into effect, it is stated there is "freedom of religion and of anti-religious propaganda." This means that people may not carry on any "propaganda" in behalf of their faith. The Communist party, on the other hand, which through its secretary directs the policies of the state, has the fullest right to carry on an aggressive war on the church. Under such policy a vast number of churches have been closed and all monasteries liquidated. The party admits to membership no Jew, Christian, or Mohammedan faithful to his religion. While people were not forbidden to attend church, religious affiliation, at least until 1936, barred their road to advancement. Education of priests became impossible, and many of the clergy disappeared in the penal labor camps. The purpose of the Soviet regime avowedly is to create a crassly materialist civilization from which every trace of religion will be removed. To accomplish this end the government will adopt any measures it deems necessary. In schools which are soviet-owned, no hint of religious teaching is permitted.

Italian Fascism. Like Stalinism derived in part at least from Marxist teaching, fascism appeared in Italy under the leadership of Benito Mussolini (1883–1945). It came into existence during the years following the First World War, when much confusion was caused in Italy by discontented people who, indoctrinated with Marxism, carried out a policy of striking. Mussolini directed a violent opposition to pacifism, defeatism, and communism. Weary of factions, many Italians supported Mussolini and his Fascist party, which in the fall of 1922 seized the government.

The state Mussolini created was totalitarian—one in which the government assumed full direction over the life of its citizens, save in religion, to which extensive freedom was accorded, especially after 1929. Supreme control rested in the Fascist party, whose decrees had the force of law. Mussolini, chairman of the Grand Council of the party and prime minister as well, initiated and controlled legislation. He also was minister of war, air, navy, colonies, foreign affairs, and the interior—complete master of the Italian state. As all important posts in the nation were held by Fascists, the party in fact governed Italy.

The Fascist party sought to make Italy economically self-sufficient, something difficult to achieve in view of Italy's lack of metals and other basic materials. The government drained swamps that the country

might increase its food supply and installed hydroelectric plants in the Alps and Apennines to make the land less dependent on imported coal. It created a merchant marine, seeking to increase exports and endeavored to stimulate production by means of tariffs. Mussolini became an ardent imperialist. This led him, in 1935, to conquer Abyssinia, which he hoped to use as an outlet for the ever-growing Italian population, also as a source of mineral and other wealth. The Italian state became militaristic; patriotic fervor became a feature of Italian public life. The army was enlarged and improved, an air force was developed, and the navy became a powerful weapon. Thus, out of the despondency and defeatism after the First World War, a new and aggressive totalitarian Italian state came into existence.

German National Socialism (Nazism). A totalitarian state resembling fascist Italy, but more efficient, rose in Germany during the 1930's. Smarting under the defeat inflicted upon them in the First World War and the difficulties of the peace that followed, and overwhelmed by the depression which began in 1929, the Germans all too readily listened to Adolf Hitler (1889–1945), who inaugurated a policy of national resurgence. His plan, expounded in *Mein Kampf*, or *My Struggle*, written while in prison for revolutionary activity, promised a new day for central Europe. On Jan. 30, 1933, Hitler was named chancellor. Next, on Mar. 5, an election gave Hitler a majority in the Reichstag, as the body of German representatives was called. Now in unquestioned control of the state, Hitler quickly transformed the German republic into a National Socialist state by outlawing all parties but that of the Nazis and subordinating all state action to his control.

A cardinal doctrine of the Nazis was that race is basic in all aspects of life. They believed that the "Aryans," or "Nordics," from whom they asserted that the Germans have descended, were a superior race characterized by great ideas, great heroes, and great deeds. These Aryans alone are responsible for world progress, the mongoloid and negroid peoples having contributed little or nothing. It was the duty of true Nazis to purify the German Nordic race of "contaminating" foreign elements, particularly Jewish. The Nazis also sought to rid Germany of non-Aryan ideas, holding that the calamities befalling their country were caused mainly by non-Aryans. Christianity, too, should be purged of its Jewish elements; it should become German and national. Some Nazis went so far as to recall from the past shadowy pagan gods such as Woden and Thor. Anti-Jewish sentiment was propagated by radio, press, and personal violence. A virulent campaign of hatred was opened against the Jews, who, the Nazis asserted, were selfish profiteers responsible for Germany's losing the First World War and threatened further ruin in Germany by fomenting communism.

The Nazi party took control of Germany much as the Fascists did of Italy. It established absolute military and political authority, filled important offices with members of the party, and disbanded other political parties. The government obediently registered the decrees of the party. A complicated hierarchy of bureaus, judicial courts, and departments came into existence. The Nazis enrolled a picked group of young men of good physique in the *Sturmabteilung* (S.A.). They

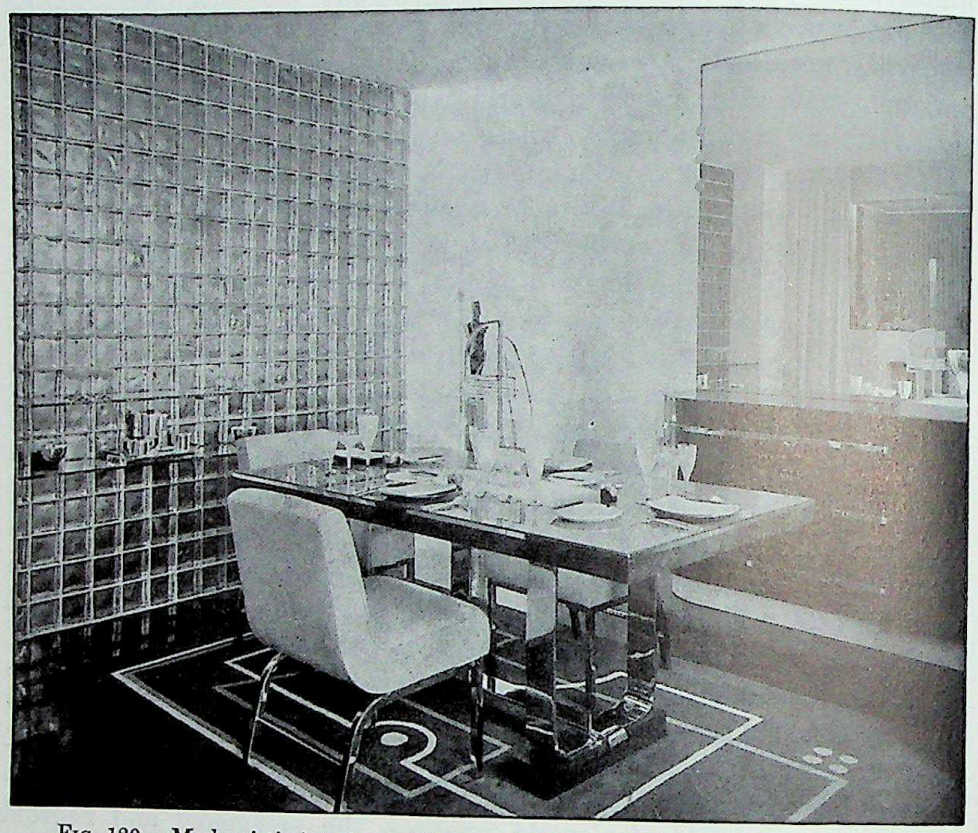


FIG. 139.—Modernistic interior. (*Courtesy of the Metropolitan Museum of Art.*)

kept order at Nazi meetings by throwing out hecklers, broke up gatherings of other parties, and suppressed manifestations that ran counter to Nazi notions. The *Schutztaffel* (S.S.) formed the Nazi bodyguard for their leader, the *Führer* Hitler.

THE TOTALITARIAN STATE AND ITS FUTURE. A totalitarian state (judged from the standpoint of such democratic communities as Switzerland, the Netherlands, or the United States) is one whose governmental activities have absorbed every aspect of national life. It controls the governmental process by means of a political party that brooks no opposition, limits free speech and free opinion, and directs the organs of government as if they were party organs. All rights its citizens enjoy

are given by the state, which stands above law and is the source of all law.

The German National Socialist state of Hitler made race the basis of citizenship. It assumed the right to restrict the liberties of "non-Aryans." Hence it curtailed their businesses, confiscated their properties, closed the professions to them, and forbade them to appear in restaurants, theaters, and other public places patronized by "Aryans." During the Second World War, Germany ruthlessly exterminated Jews in camps especially instituted for that purpose and also "Aryan" citizens who for physical reasons could no longer serve the fatherland. The German state also was virulently nationalistic, possessed an effective military machine, and employed a highly efficient propaganda organization. It regulated newspapers, motion pictures, and radio; suppressed publication of books critical of the Nazi regime; directed all education; and restricted religious activities, particularly of the Catholic Church, whose priests were prosecuted on flimsy charges. To enforce its policies, the German state organized, on a scale larger than fascist Italy, concentration and labor camps for citizens, whether Jew or Aryan, who refused to be "coordinated."

Fascist Italy and Nazi Germany both succumbed during the Second World War, being defeated in 1945. But this was not the end of totalitarian rule. The U.S.S.R. emerged from the struggle stronger than when she entered it. The principle of communism placed the control and direction of almost all life in the hands of the state. A vast bureaucratic governing personnel came into existence. The loudly proclaimed "democratic" character of the Soviet regime was in fact a centralized despotism effectively executing its wishes under the supervision of a numerous police. While according to the constitution of 1936, religious rights of the people were recognized, the Orthodox church has been reduced to a state organ supervised by Communists. After the incorporation into the U.S.S.R. of Estonia, Latvia, Lithuania, eastern Poland, and the eastern part of Czechoslovakia, the Roman Catholic Church in those lands was drastically curtailed, priests disappeared, and families were broken up and dispersed, especially in Lithuania, in order to destroy the strength of church and nation. Seminaries were closed, the religious press was suspended, bishops could not be appointed, churches were closed, and all contact of these people with western Europe was made impossible, a fact which gave rise to the figure of speech of an "iron curtain" which had descended on the borders of the Soviet Union. The Lutheran churches, according to what has been heard from them, have suffered in the same manner.

The U.S.S.R., a socialist state, assumes full authority to interpret all scientific teaching, all philosophic and religious thought, all artistic

activity. Citizens receive their rights from the state, and the state may contravene such rights as its interests seem to dictate. The government's policy shifts continually, and citizens must adapt their opinions to the state's changing teaching. Citizens are subject to arrest on a scale unknown in any other modern state. Their movements are carefully circumscribed. They cannot change their jobs freely, nor may they travel without restrictions. And, finally, an immense system of forced labor in concentration and labor camps exists at the present moment. Many inmates have been sentenced without trial, after being arrested on vague charges of being "enemies of the people"; they labor for little

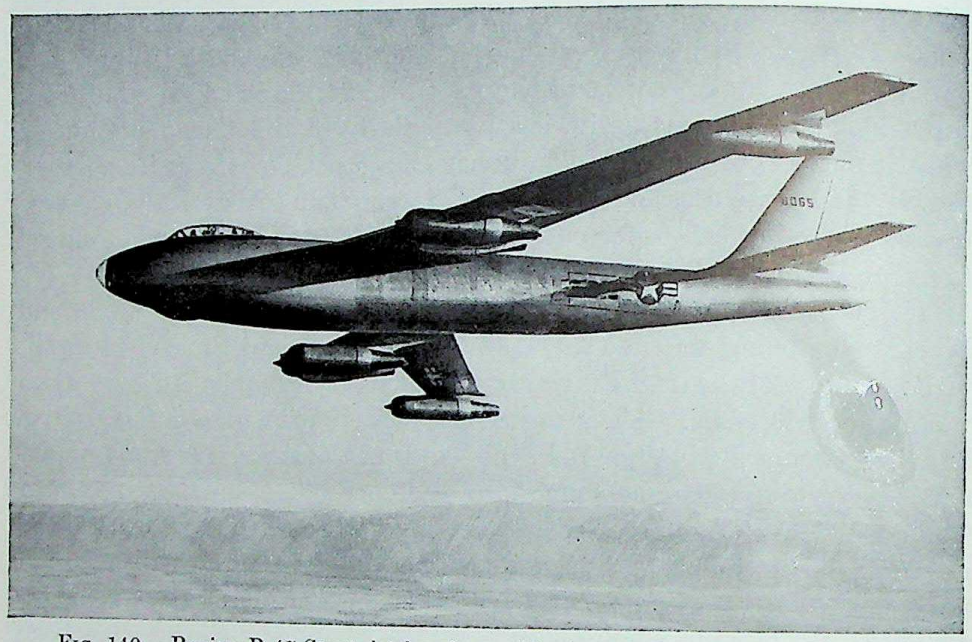


FIG. 140.—Boeing B-47 Stratojet bomber. (*Boeing Airplane Company, Seattle.*)

or no compensation and live under hardships and ill treatment. The present socialist political monolith is a far cry from the vociferous idealism of the early revolutionaries.

From these examples it is clear that totalitarian states practice more or less similar methods of government, but their basic ideas—philosophies of life—differ widely. It is precisely the philosophical conceptions of life, including religion, which form the underlying basis of a state. It is around them that the present world crisis revolves. Fascists and Nazis held that liberal and parliamentary states are corrupt and decadent. Soviet publicists assert that "bourgeois capitalist" society must vanish, its place to be taken by a peoples' democratic communist state. But can such totalitarian states fill the needs and aspirations of their subjects? To this question the historian of the future will make a full reply. The

dangers portended by such rule are real; they run counter to the basic rights of man and impugn his true dignity as a moral being.

THE SECOND WORLD WAR, 1939–1945. Meanwhile the Second World War, an unparalleled catastrophe, broke out in August, 1939. Its causes, too complex and numerous to be given here, lie deep in the political, social, and economic difficulties of the modern world. The moral and intellectual confusion of the decades before its outbreak also contributed toward the conflict. After their accession to power in 1933, the Nazis used every national resource to create an overpowering military machine capable, as they optimistically believed, of meeting any combination of enemies. They organized motorized and mechanized divisions and built the largest air force in the world. They coordinated diplomatic and consular services, the military, air, and naval organizations, and also the propaganda branches of warfare to a degree never before realized. This enabled the Nazis to move overwhelmingly powerful forces successfully and with the greatest speed, thus forcing military decisions with lightning rapidity.

The "blitzkrieg" (lightning-swift war) method proved most successful. By August, 1940, the Nazis had overrun Poland, Denmark, Norway, the Netherlands, Belgium, Luxemburg, and France. But they were balked in their attack on England. Their air force was defeated with the loss in the air over England of at least 2,375 planes in a desperate assault which extended over 84 days. How many more planes were destroyed over the North Sea and the Channel or over the Continent and failed to return to their bases is not known. Nor are figures available of the total losses in air personnel, which surely were great, so great indeed as to cripple for the remainder of the war the efficiency of the German air force. Although the earlier phases of the war ended in great triumphs for Germany, the failure to reduce England in the autumn of 1940 proved a serious setback, which was to assume ever-growing importance during the following months.

The German government meanwhile came to believe that any future attack upon England was endangered by the might of Russia, which, Hitler and his advisers thought, would certainly attack Germany from the rear. Hitler aimed at nothing less than the destruction of the British Empire. To accomplish this stupendous task, he would have to conquer the British Isles or else attack Egypt, seize the Suez Canal, take the Tigris-Euphrates Valley, and move upon India. Such grandiose schemes, worthy of a Napoleon, seemed feasible in view of the small number of British troops defending these strategic points. But any move would be opposed by the U.S.S.R., which would never permit Germany to establish imperial control over Constantinople, Turkey, Egypt, and the Tigris-Euphrates Valley.

Underestimating Russia's military power, the Nazis prepared to attack her. They forced Hungary, Rumania, and Bulgaria to become allies. Next they turned their attention to Greece, at that moment at war with Italy. Mussolini, in 1940, had joined Germany in the war on France, hoping to get Tunisia, Corsica, Nice, and part of Savoy. He also wanted Egypt and the Suez Canal, to be seized from England. But the Italians were nearly defeated by the prowess of the Greek army. To save Mussolini and advance his own arms, Hitler invaded Greece and seized the island of Crete. Then his armies were ready to expel the English from Egypt, seize the Suez Canal, and paralyze the British Empire. Meanwhile the Yugoslavs had refused an alliance with Germany, so Hitler's troops overran Yugoslavia; but the Germans were unable to cope with the guerrilla warfare in which the Serbs and Montenegrins are skilled.

Next, in 1941, Hitler moved against the U.S.S.R., thinking to destroy the Soviet's armies in a brief summer's campaign. But when the icy snows of winter swept the Russian plain, Hitler's troops had not conquered the Soviet's forces. The Germans, stopped before Leningrad (as Petrograd now was called) and Moscow, suffered severely during the hard winter of 1941–1942. Failure to destroy Soviet military power was the second setback the *Führer* was to experience.

The people of the United States meanwhile watched the progress of German arms with growing uneasiness. Canada to the north of them and also Australia, New Zealand, and South Africa had supported their mother country from the beginning. If England were to collapse, the United States might have to face Germany on the American continent. Meanwhile also the vast numbers of American citizens of Polish, Czech, Slovakian, Serbian, Norwegian, Danish, Swedish, Greek, Dutch, Luxemburg, Belgian, and French origin affectionately regarded their motherlands and stimulated the growing dislike of German designs. For these and other reasons, the United States government showed its disapproval of German ambitions and, in 1940, began to strengthen its army and navy, giving out its military stores, guns, cannons, and even destroyers to Great Britain—the famous lend-lease agreement. As the autumn of 1941 wore on, war with Germany seemed imminent.

The Position of Japan. Japan also studied the military situation. Since the Treaty of Versailles in 1919, it had strengthened its position as an Asiatic power. Having secured the Caroline and Mariana Islands, Japan converted them into naval bases. Her leaders dreamed of a Japanese economic and political leadership in eastern Asia. This required the subjection of China and the ejection of the white man from the Philippine Islands, Indo-China, the Malay Peninsula and Singapore, Burma, and the Dutch East Indies. In 1931 Japan began the conquest

of Manchuria, in 1937 seized Shanghai, and by the opening of the war in Europe in 1939 had extended her control over much of eastern China.

Impressed by Germany's victories and believing that the U.S.S.R. in the fall of 1941 was on the verge of collapse, Japan struck. But instead of joining Germany to destroy Russia, Japan hoped to conquer an empire in the Pacific. Seeking to destroy at one stroke the naval power of the United States in the Pacific, on Dec. 7, without warning, Japan attacked the American fleet at anchor in Pearl Harbor in the Hawaiian Islands. Great Britain and the Netherlands joined the United States in a bitter war with Japan, whose allies, Germany and Italy, declared war upon the United States. Japan won sensational victories, seizing Hong Kong, the Philippine Islands, the Malay Peninsula, Singapore, Burma, and the incomparably rich East Indies. But in 1942 the Japanese navy received severe setbacks in the battles in the Coral Sea (April and May), off Midway (June), and in the Solomon Islands (November). United States soldiers in the Solomon Islands and the Australians, supported by Americans, on New Guinea halted the Japanese in their southward movement. Thus by the close of 1942 Japan had failed in its aim to defeat China, destroy American naval and military power in the Pacific, and reduce Australia.

German Military Fortunes in 1942. Germany's chances for victory did not improve during 1942. Japan's attack at Pearl Harbor had brought the United States into the war; but believing Japan would keep America occupied in the Pacific Ocean, Germany, followed by Italy, declared war on the United States. This proved a serious miscalculation, for the American government was able not only to deal with Japan in the Pacific but even aided Germany's European enemies with food and weapons on a scale that had been thought impossible. Meanwhile Hitler and his allies failed to destroy Soviet resistance by seizing the region between the Don and Volga rivers and closing in on the important industrial center of Stalingrad. They wanted to take the Caucasus area in order to replenish their depleted oil supply. But, as in 1941, the Russians defended themselves with tenacity, retreating slowly and exacting great toll of life and material. The defense of Stalingrad halted the Germans. Such was their loss that they could not reach the oil wells of Grozny, north of the Caucasus, not to mention those at Baku to the south. Finally, when winter came, the German army was extended along a long front from Leningrad to the Caucasus, improperly clothed, ill prepared against the frosts of a Russian winter, and unable to keep the offensive. By the beginning of 1943 the Germans were forced to draw back, relinquishing their hard-earned gains in the Don and Volga area.

At the close of 1942, Germany, which probably had lost as many men in the Russian campaigns as in the entire First World War, had to face

a new threat from England and the United States. With the utmost secrecy, these countries planned an invasion of North and West Africa to drive the Italians and Germans from that continent. The United Nations, as the powers allied against Germany were called, aimed to attack Germany from the Mediterranean through Italy, thus opening a second front to relieve Russia of some of Hitler's pressure and prepare the way for Germany's ultimate defeat. This move was carried out on Nov. 8, and Morocco, Algeria, and French West Africa fell into their hands.

Allied Invasion, 1943. Finally, when in May, 1943, the Germans and Italians were forced to surrender Africa, the English, Canadians, and Americans undertook the invasion of the Italian homeland. The allied troops swept into Sicily, and the Italian government, in spite of the still-resisting Nazis entrenched in the peninsula, gave up Sept. 3, 1944. By that time a tremendous display of naval, air, and military cooperation enabled the English, Canadians, Americans, and the forces of their allies to land on the Norman coast of France on June 6 and entrench themselves in the face of violent Nazi efforts to dislodge them. With great dispatch they forced the Germans out of France, Belgium, and part of Holland and by the close of September stood on the confines of Germany itself.

Since checking the Nazis at Stalingrad during the winter of 1941–1942, Soviet troops had seized the offensive, and by the close of 1944 their line extended from eastern Prussia southward to the Carpathian Mountains. Soon Hitler's allies—Rumania, Bulgaria, Albania, and Jugoslavia (forced to become an ally after being conquered by Hitler)—deserted Germany. Meanwhile Hitler's forces early in 1945 failed to keep back the allies along the Rhine, and, crushed between these troops irresistibly bringing pressure from the west and the Russians moving from the east, they surrendered on May 8, 1945. By this time also the last embers of resistance in Italy had been extinguished, and Mussolini was slain on Apr. 28. Meanwhile the Netherlands also had been freed.

The Military Contribution of America. In spite of all the military gear the European allies produced, they could scarcely compete with German manufacturing skill. American war production therefore tipped the scale in favor of the allies. First, it must not be overlooked that America, without threat of invasion or bombardment, was able to convert her war potential to military manufacture. In 1941, when Japan raided Pearl Harbor, the American navy was not ready. The air force, military equipment, and military and naval personnel were utterly insufficient. Yet, during 1942, the country produced about 60,000 aircraft, 45,000 tanks, 20,000 antiaircraft guns, and no less than 8,000,000 tons of merchant shipping. During that year was begun the colossal naval con-

struction which soon made the United States Navy the mightiest ever assembled. By the close of 1942, the United States Army numbered about 7,000,000 men. By November, 1943, the United States had sent 7,000 planes, 3,500 tanks, and 195,000 motor vehicles to bolster the Russian army. From the American home base, troops were sent to Africa. An air force and troops were transported to England, and the armies of the Free French, Dutch, Norwegians, and Belgians were equipped with the tools of war. At the same time sea, air, and land forces were directed westward over the Pacific against Japan, and that

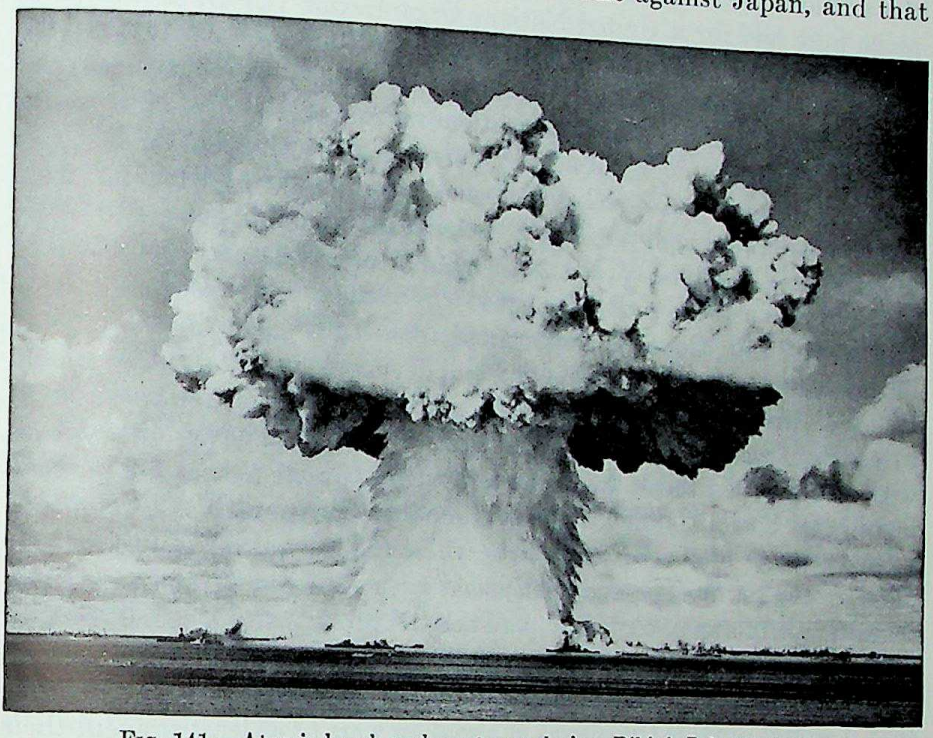


FIG. 141.—Atomic-bomb underwater explosion, Bikini, July 25, 1946.

country's powerful defenses in the islands of the Pacific crumpled or were by-passed.

Finally occurred the most astounding event of the war—the dropping of atomic bombs on the Japanese cities of Hiroshima and Nagasaki on Aug. 6 and Aug. 9, 1945, snuffing out the lives of no less than 120,000 people. Four square miles of Hiroshima's city center vanished in a moment. Striking as was America's gigantic effort against the enemy across two oceans, the invention and preparation for explosion of those atomic bombs was an even more remarkable achievement. It marked a stage in military history, probably more far-reaching in its consequences than any previous invention. Such was the impact of these frightful explosions on the people of Japan that their government capitulated on

Sept. 2, 1945. The Soviet government had hurriedly declared war against Japan on Aug. 8, and the Russians had seized Manchuria. The collapse of Japan's empire as a result of the atomic explosions could not be postponed.

United Nations Organization. As after the First World War, when the League of Nations was formed, so now a determined effort was made to establish some organization effective in establishing peace and maintaining it. Such was the destruction and desolation caused by the war and the weariness of the people that without a discordant vote plans were laid for a United Nations Organization (UNO, shortened to UN), which was organized at San Francisco from Apr. 25 to June 26, 1945. Its charter was adopted on Oct. 24, 1945. Although similar to the League of Nations, this organization was more elaborate. There was to be a General Assembly of all members, a consultative and deliberative body. A Security Council was formed, composed of delegates from eleven more prominent nations, possessing considerable powers to settle disputes and establish peace. A right of veto was accorded to four powers: France, Great Britain, the U.S.S.R., and the United States. The Trusteeship Council is concerned with lands taken by the enemy during the war, their administration and development. An International Court of Justice was created. A Military Staff Committee was constituted, for it was thought at first that the UN would have a military force with which to establish peace among future troublemakers. The Economic and Social Council, formed from the representatives of eighteen member states of the UN, was to serve as the central bureau of a large number of commissions and specialized agencies empowered to consider a multitude of social, economic, and related problems. A secretariat, to be in session permanently, was set up. Every effort was made to give the UN more power than the League of Nations possessed, in the hope that it would provide the means of avoiding wars or at least prevent their spread by stopping conflicts even by force and settling disputes by negotiation or arbitration.

End of European Imperialism in Asia. The Second World War marked the end of an epoch in the relations of European nations with the people of Asia and adjacent islands. Since the days of Vasco da Gama, Spain, Portugal, the Netherlands, France, and England had established their authority in various parts of the Orient. The wealth of the East contributed to the prosperity of these European peoples, and economic or colonial imperialism long proved profitable. By the opening of this century, however, it was obvious that a change was coming, for a spirit of nationalism was fomenting independence. The First World War, in which all the peoples of the Orient were interested and some were directly involved, stimulated awakening nationalist sentiment. Possessing civi-

lizations older than those of the European countries, China, India, and the East Indies sooner or later were bound to embark upon their own independent course.

As early as 1918 the British government, recognizing the portent of nationalism in India, moved to gratify some of the wishes of the people of India. It was planned to associate Indians in the administration and so in time develop self-governing organs. But most stimulating was the example of the United States policy in the Philippine Islands, whose people, long under Spanish tutelage, had developed a kind of life very like the European. In 1934 a plan was adopted whereby the Philippine Islands would achieve their independence in 1944. The Second World War, however, brought on a Japanese invasion. Not until February, 1945, were American forces able to drive out the enemy. At the conclusion of the war, with the collapse of Japan, the Philippines took their place among the independent peoples of the world.

The problem of India's self-government offered a grave difficulty. The Hindus constitute the greatest part of the population, but the Mohammedans are a powerful minority, who were loath to join the Hindus, fearing that they might be overwhelmed by them. The Hindu Nationalists opposed the Moslem League, the former agitating against Great Britain, the latter remaining friendly to the connection with the British government. After much prodding by the British Cabinet, in 1947 the Indian Independence Act was passed, and on Aug. 15, 1948, the British government transferred full sovereign power to the new states. India was divided into two parts—Pakistan, two areas in which most people were Moslems, and India, where the majority were Hindus. The princes of India, hitherto a prime obstacle to the formation of a unified state, lost their primacy; the English king lost his sovereign title in India, which, however, retained dominion status; and finally, in 1949, British troops left India.

During this time also Burma, which in 1935 had been given a degree of self-government, achieved full independence by the passage in December, 1947, of the Burma Independence Bill. In 1948 Ceylon was given extensive self-government with dominion status. Also in 1948 the Federated Malay States, comprising the states of the Malay Peninsula, was formed. Henceforth the affairs of these states were to be regulated by a constitution and a high commission representing the British crown.

Changes equally as significant as those in India transformed the status of the Dutch East Indies. Nationalist sentiment was present among the peoples of Indonesia, as the islands were named, even before the First World War. In 1942 Queen Wilhelmina of the Netherlands proposed far-reaching changes in the status of Indonesia, suggesting a commonwealth in which all Dutch colonies as well as the Netherlands

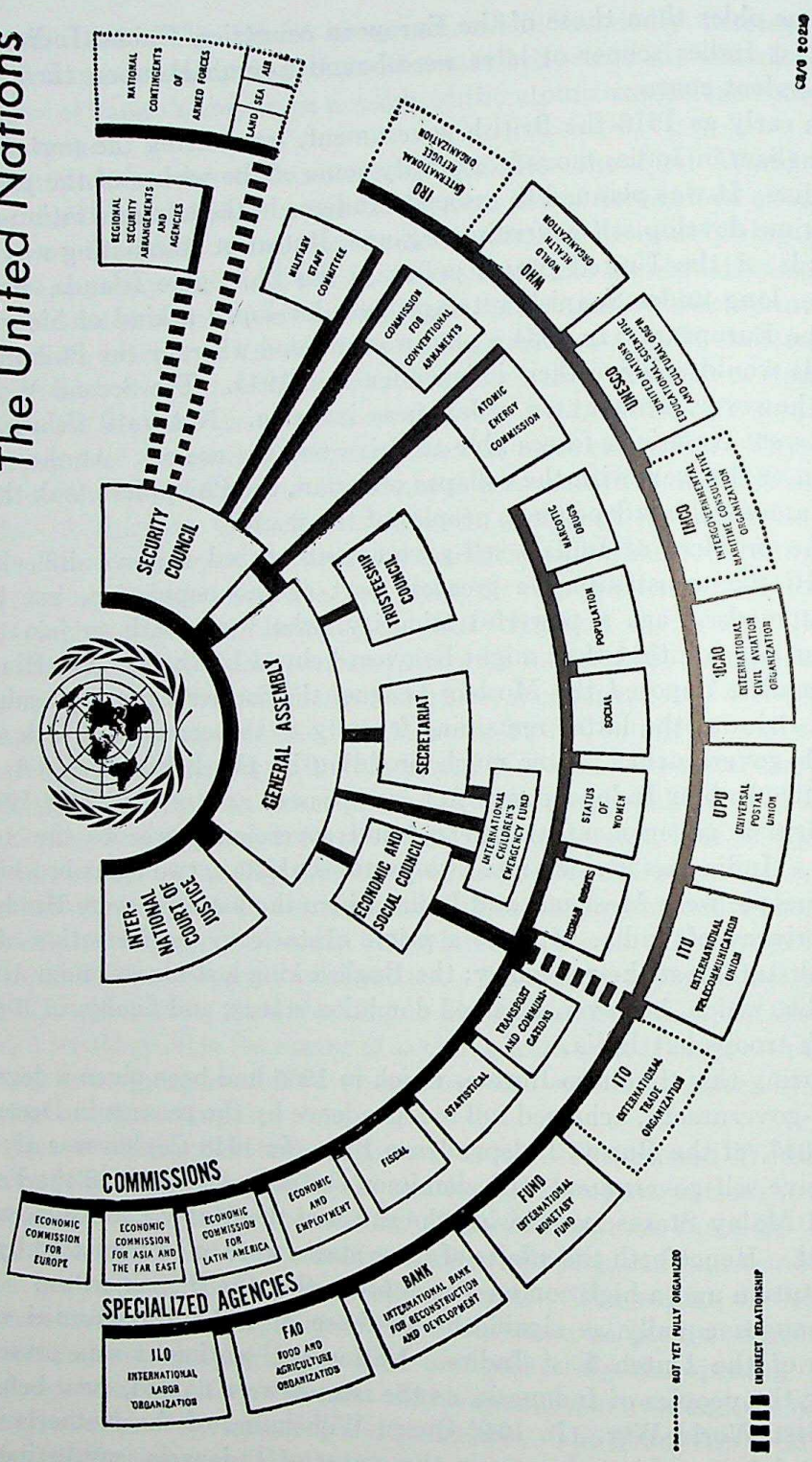


FIG. 142.—Structure of the United Nations. (*Information Center, United Nations.*)

should participate, with full freedom for each part to manage its own internal affairs. But after the Japanese invasion of Indonesia in 1942, Soekarno, a nationalist leader, who collaborated with the Japanese, proclaimed the independence of Indonesia two days after the Japanese forces in Indonesia surrendered. These events led to much negotiation, in which misunderstanding aggravated feelings on both sides. However, in 1949, the government in The Hague granted full independence to the Republic of Indonesia.

Thus passed direct European control from these possessions which for more than four centuries had played so vital a part in the economic, political, and other life of Europe. Indo-China at the present moment still remains a possession of the French Republic, and Portugal still retains the insignificant remnants of her once-vast empire—a part of the island of Timor and the city of Macao. The United States, of course, occupies the numerous Pacific islands which, in 1942, belonged to Japan and which were seized by her during the war.

The Arab Problem. The Arabs—Moslems in religion except for the small group of Christian Arabs in Lebanon—likewise dreamed of independence. For centuries the Egyptians had been subject to the Turks, but as the Turkish state declined they, occupying a strategic position, fell under English domination. France took control over Tunisia, Algeria, and part of Morocco. Spain held another part of Morocco. Italy seized Tripoli. After the defeat of Turkey in 1919 as an ally of Germany, other Arab lands were placed under the supervision of France and England as directed by the League of Nations. Thus parceled out, the 60,000,000 Arabs seemed to have little chance to realize their national unity.

After the Second World War, in March, 1945, the Arabs, through their representatives at Cairo, speaking for Egypt, Iraq, Transjordan, Saudi Arabia, Yemen, Lebanon, and Syria, formed the Arab League. This league was directed by a representative council and a permanent secretariat. Its purpose was to speak for Arab national interests and support each Arab state in its political interests, including Libya and the Sudan. But while nationalism unmistakably was its driving force, dissensions among the Arab families prevented unity of action.

Among the demands of the Arabs was the withdrawal of British troops from Egypt and the incorporation of the Sudan into Egypt. The Arabs of Syria and Lebanon, after much effort, secured the withdrawal of French and British troops. In Iraq and Transjordan, the British granted practical independence. But dissensions based upon family interests kept the Arabs from preventing the partition of Palestine. There the Jewish population, ever increasing because of immigration, especially after the close of the Second World War, desired to set up a

new state under the name of Israel. The question of boundaries was a thorny matter, for the Arabs refused to move from sections claimed by the Zionists, as the propagators of Israel were called. But the Zionists had wealthy friends in America and possessed a technical skill lacking to the Arabs. There was fighting, and the United States recognized Israel as a *de facto* state in May, 1948. In July of the next year the last Arab state signed an armistice with the republic of Israel. Although quarrels with the Arabs are not yet ended, the new state seems assured of some future.

The Iron Curtain. Two most important changes in world politics followed as a result of the Second World War. The first was the emergence of the U.S.S.R. as the greatest political and military power occupying the land mass of Eurasia. The center of politics shifted from western and central Europe to beyond the Don River and the Ural Mountains. This was not only a revolution in international political relations, it was also a fundamental revolution in the life of man affecting social and private life, science, art, economics, philosophy, and religion.

Striking also was the second change, the final emergence of the United States as the most influential state in the entire world. Formerly the might of the British Empire had successfully insisted on some order in the world. The British navy had kept watch and ward for peace in a world in which English-speaking peoples played an enviable role of leadership. The First and Second World Wars impoverished Great Britain and also her European friends. The armed might of the British Empire declined. Leadership passed to the United States.

For a brief space there was a flourish of popular optimism in the United States about the future of peace. The United Nations Organization was formed, and had not all the allies fought for "peace and democracy"? But there were too many suspicions, too many recriminations. Communist Russia, ever critical of capitalism, made no secret of its mistrust of capitalist America, whose people likewise exhibited opposition to Marxism.

Under such circumstances it was difficult to make peace with defeated Germany. Treaties of peace were speedily enough arranged with Rumania, Bulgaria, Hungary, and Italy. Germany was to be jointly occupied by the four major allies. But so suspicious were the Soviet leaders that a common military-occupation policy could not be worked out, and each power settled down to administering the part it held. A treaty disposing of the future of Germany, as well as that of Austria, seemed impossible to frame.

Gradually the U.S.S.R. organized a series of satellite states along her western border. The Russian army remained in control of the eastern approaches to Germany and so decided the fate of Rumania, Bulgaria,

Jugoslavia, Hungary, Czechoslovakia, and Poland. By 1948 these states, under the U.S.S.R., had been converted into avowedly communist states. Eastern Germany, occupied by the U.S.S.R. and Poland, likewise was administered in Russian Communist fashion.

This policy of forming satellite states along the Russian border also was extended to the Far East. There the U.S.S.R. had acquired the Kurile Islands from Japan. Northern Korea became a communist state. Toward China, in which the Moscow-trained Communist, Mao-Tze-Tung, rose to power, Russian policy was designed to encourage Communists against the Nationalist government headed by Chiang Kai-shek, who had fought Japan throughout the entire war. Finally, in June, 1950, the latter's power was so reduced that he held only the island of Formosa.

At other points along her periphery, the U.S.S.R. was exerting pressure—in Persia, in Turkey where she wished to enlarge her rights on the Dardanelles, in the Baltic Sea, and in Finland. While something may be said for Russia's policy in view of Hitler's attack on her in 1941, these political successes created uneasiness in the parts of the world not under Soviet influence. Added to this was the increasing difficulty of cooperating with Russia on most matters, as, for example, the blockade of Berlin instituted by the Russians, the suppression of religious freedom in her satellite states and in Russia, the destruction of the Lithuanian population, and the role that forced labor played in Soviet economic life.

Finally, the Soviet Union erected an impenetrable barrier between her own subjects and the Western world, discouraging and even preventing intercourse. A vituperative press carried on a barrage of criticism against the noncommunist Western world, which was accused of preparing war on the "peoples' democracies." These methods, which sealed her subjects from the truth of what was going on outside Soviet territory, were successfully fostered by the Iron Curtain, a phrase not inaptly describing the barrier between communist and western countries.

The Cold War. At numerous points Soviet policy clashed with the western nations, who felt threatened in their security. There were, for example, strikes engineered by the Communist parties in Italy, France, and other countries, and it was certain that these strikes were encouraged by the U.S.S.R. In Greece an attempt was made to foist a communist government upon the people. From Albania, Jugoslavia, and Bulgaria there was an infiltration of Communists, who supported Greek rebels in their effort to overthrow the Greek government. There also was a Soviet attempt to force Turkey to grant concessions on the Dardanelles and Bosporus.

Fearful of the extension of totalitarian power, the president of the United States, Harry S. Truman, in the spring of 1947 asked Congress to appropriate money to help Greece and Turkey defend themselves against

such pressure. To strengthen other countries in their democratic life, the United States, in June of the same year, inaugurated the Marshall Plan. Money was to be used to build up the economy of European states. By October, 1947, no less than $16,600,000,000 credit had been extended to sixteen states. Thus was undertaken the European Recovery Program, in which the states receiving aid agreed to cooperate in putting their finances in order, stabilize their currencies, balance their budgets, and remove hampering restrictions on trade. To attain this end the United States agreed to supply for the period ending 1951 no less than $19,300,000,000, provided for by the Economic Cooperation Act of 1948.

The spending of such sums had an exhilarating effect upon European economic life. Rehabilitation proceeded rapidly, and prosperity resumed. But the Communists opposed this policy, asserting that it was "imperialistic," that recipients of such money would become the "slaves of capitalist America." Russia and her satellites—Hungary, Albania, Bulgaria, Rumania, Poland, and Czechoslovakia—refused to join in this policy. Finland, exposed to Russian displeasure, thought it wise to abstain. The Communists sought to wreck the European Recovery Program by fomenting strikes and encouraging obstructionist tactics in government. To present a united front against "imperialists and nationalists," to "preserve freedom and peace," the Cominform was organized in October, 1947.

The chasm between East and West yawned more widely after February, 1948, when a communist minority in Czechoslovakia, with Soviet help, seized control of the state and revamped Czech life according to the Marxist conceptions. Arrests, treason trials, executions, suppression of religious press and activities, and persecutions became the order of the day. As Czechoslovakia occupied a delicately sensitive position in European life, this political reversal alarmed the western powers.

Believing themselves threatened, several states, led by Great Britain and supported by Canada and the United States, formed the North Atlantic Treaty Organization (NATO), which declared that "an armed attack against one or more of them in Europe shall be considered an attack against all." Ratified by April, 1949, this organization came to embrace most of the states of western Europe. By that date the U.S.S.R. and its satellites had formed a Council for Economic Mutual Assistance, designed to assist those "democratic" nations who had refused "to submit to the Marshall Plan dictate, as this plan violated the sovereignty of countries and the interests of their national economies."

Such is the pass to which has come the faith held in 1945 for a harmonious world after the war should end and a happy peace established with justice for all. The shock was accentuated when, during the early

months of 1950, the government of Chiang Kai-shek collapsed before the assaults of the communist Mao-Tze-Tung. China, moved by a nationalist communist zeal, became a firm ally of the U.S.S.R. Would other countries follow China's example and fall under Marxist and Soviet direction? Korea, freed from Japanese control in 1945, was occupied by Russian and American troops under United Nations authority, the country being divided between them along the thirty-eighth degree north latitude. A Soviet-directed government of North Korea, on June 25,

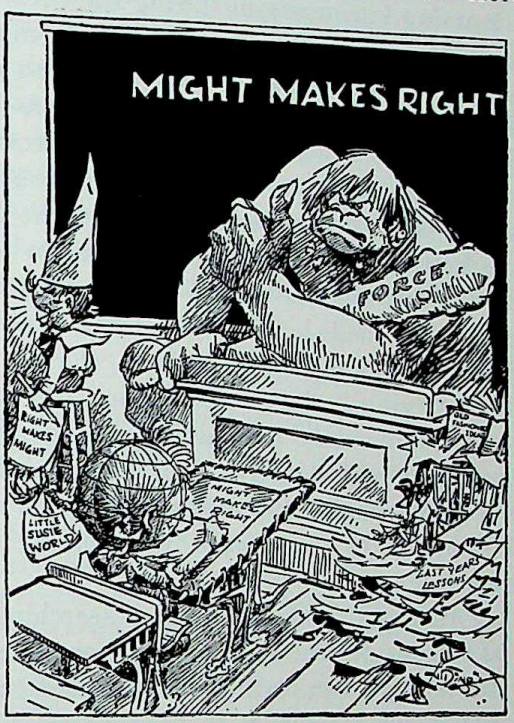


FIG. 143.—"All Our Lessons to Do Over Again," by Ding. (*Courtesy of the New York Herald Tribune.*)

1950, sent its army, trained by Soviet officers and equipped with Soviet arms, into South Korea, which had consistently refused to adopt a communist form of government. The United Nations, seeing in this a threat to the freedom of nations along the borders of the Soviet colossus, moved to stop the North Korean aggression.

A vigorous resistance by the troops of fifteen countries, including the United States, supporting the South Koreans, ensued. In November, after the North Koreans were severely beaten, the government at Peiping sent Chinese troops as "volunteers" to destroy the United Nations forces. After much fighting, which cost the Chinese a million casualties, a temporary cease-fire agreement was reached on July 1, 1951. But the negotiations that followed failed to establish peace, the communist

leaders apparently being unwilling to have any settlement short of one made possible by a victory.

Mechanical and Engineering Character of War. The modern world, increasingly organized on a mechanical basis to which the study of science contributed enormously, employs mechanical equipment to carry on its wars. By the close of the First World War the contestants had produced such mechanized equipment as automatic guns, tanks, radio communication, poison gases, and the military airplane. These devices attained amazing improvement during the Second World War. The airplane was perfected, its destructive powers being illustrated by the military ruin of Germany in 1945. After 1940 mass production and precision manufacture by assembly-line methods were developed fantastically. New weapons appeared—radar for detection of distant objects moving in the air; sonar for noting ships and submarines; proximity fuses to explode shells at a given point above the ground without being timed; schnorkels for submarines, enabling them to travel indefinitely under sea. Guided missiles—the V-1, a guided bomb, and the V-2—a napalm bomb, and shells loaded with atomic explosives were produced. At the close of the war, as noted above, the United States produced the A-bomb, carrying a charge of uranium of colossal explosive force, radioactive and immensely destructive. At the present time a hydrogen bomb, vastly more destructive than the atomic bomb, has been produced. Such weapons enable the modern powerful state possessing an industrialized economy to wage wars in a manner never dreamed possible fifty years ago.

The Fateful Present. Today a serious searching of heart and mind has forced us to consider the validity of much of our thought and action. Our forebears have bequeathed to us noble cultural achievements; through science our knowledge of nature has increased marvelously; technology has enabled us to expand our productive efforts to a degree hitherto unknown; the crafts have increased comfort, happiness, and well-being; art has embellished our activities; religion and ethics have provided a serious foundation on which to rest our practical efforts as well as our deepest needs. But although we have made such conquests over nature and inherited much sage teaching—religious, ethical, and metaphysical—we still are confronted with the central age-old problem of man himself, his nature and destiny. Facile notions producing a tangle of optimistic views about progress have led us to forget some of the noblest elements of our cultural traditions. We have naïvely assumed that the main portion of life was the question of loaves and fishes. We all too frequently have forgotten that life's first task is to address itself to the needs of the whole man. It is a profound truth that, in the ultimate analysis, culture depends upon what we conceive man's

nature, purpose, and mission to be. Having vastly extended our control over nature, we have failed to direct ourselves in the light of an all-embracing purpose.

Culture—the common way of living and thinking—has its roots in the dim paleolithic and neolithic past. Its primary concern is not with the externals of culture but with the moral and rational labor of man. Civilization, however, may discard so much of its accomplishment in science, industry, religion, art, and learning that a collapse may well result. Great difficulties beset the present; but no matter how insoluble these seem to be, they do not warrant a completely pessimistic view. Culture springs from common faith, effort, and cooperation. Science and industry may bestow abundant blessings if men of good will labor for the common good. If they do not, dangerous crises confront us. The present hour is one in which to store up the fruits of common effort, which implies faith, hope, and charity. Men possess a measure of free will to address themselves to such ends. Whether they are willing to do so remains to be seen. The fate of the future rests in the decision of the present.

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